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IS GELSEMIC ACID IDENTICAL WITH ÆSCULIN?

With Observations on the Preparation, Properties and Recovery, when Absorbed, of the Important Constituents of Gelsemium Sempervirens, and Gelsemium Poisoning.

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In a former number of this journal (Jan., 1870) the writer announced that *Gelsemium Sempervirens* contained a non-nitrogenized principle, of an acid reaction, which was named *gelseminic*, or *gelsemic acid*; and also a strongly basic principle, which was named *gelsemia*, or *gelsemine*.

From a subsequent examination of the constituents of the plant, M. Sonnenschein and Charles Robbins concluded that the so-called *gelsemic acid* was identical in properties and composition with the glucoside *æsculin*, found in the bark of the horse-chestnut, and certain other barks ("Ber. der Deut. Ges.," Sept. 1876, 1182).

Before examining this question of claimed identity, the method, of several employed, which we have more recently found the most satisfactory for the extraction of the two important constituents of the plant, will briefly be given.

Preparation.—100 grams of the powdered dry root are macerated for two days in 400 cc. of a mixture of equal parts of water and alcohol of .815, the mixture being slightly acidulated with acetic acid and occasionally warmed and agitated. The liquid is strained through muslin, and the solids well washed with water containing a little alcohol, the washings being collected with the first liquid. The whole is evaporated to about 200 cc., and allowed to stand until the resinous matter has deposited. The liquid is then filtered, concentrated to about 80 cc. and, if necessary, again filtered.

1. *The non-nitrogenized principle.*—This is extracted from the concentrated liquid, while it still has an acid reaction, by ether, in the

usual manner, using three or four volumes of the liquid in two or three portions.

The crystals obtained on evaporation of the ether are washed with a little absolute alcohol, which readily dissolves the adhering coloring matter. The residue may be further purified by a second extraction by ether.

A very good method of purifying the substance, especially from the last traces of the alkaloid, is to dissolve it in about two hundred and fifty parts of water, by the aid of a few drops of ammonia, and then treat the clear solution with diluted hydrochloric acid, added drop by drop until the point of neutralization is almost, but not fully reached, taking care that the first cloudiness or precipitate produced has fully crystallized before adding another drop of the acid. The crystals are collected on a small filter and washed with a little cold water.

2. *Gelsemine*.—The liquid from which the former principle was extracted is gently warmed until the dissolved ether has been expelled. It is then rendered slightly alkaline by sodium hydrate or carbonate, and the liberated base extracted by ether, which is allowed to evaporate spontaneously.

The impure alkaloid thus obtained is dissolved, by the aid of a few drops of hydrochloric acid, in about 12 cc. water, the solution filtered, and the filtrate treated with a very slight excess of sodium hydrate, when a large portion of the alkaloid will separate as a pure white precipitate. This is quickly collected on a filter and washed with pure water. The remaining portion of the alkaloid is extracted from the filtrate by ether or chloroform.

From the dried root of the plant we obtained, after this manner, 25 per cent. of gelsemine and 50 per cent. of the acid principle.

Is Gelsemic Acid Identical with Æsculin?

For the purpose of answering this question various samples of the gelsemium principle were examined comparatively with a sample of *æsculin* prepared by E. Merck, of Darmstadt. It consisted of a spongy, sparkling white mass of minute (microscopic) needles and prisms. On comparing it with a somewhat colored preparation obtained from horse-chestnut bark, the substances presented essentially the same properties in the several respects examined.

This comparative examination showed:

A. These principles agree more or less in the following respects:

1. Both substances are readily soluble in the *caustic alkalies*, forming solutions which have a yellow color by transmitted, and appear blue by reflected light, the fluorescence appearing in both instances even in very highly dilute solutions, being distinctly marked in a 100,000th solution.

The fluorescence of the gelsemium principle, however, is *greenish blue*, whilst that of *æsculin* is deep *sky blue*. The fluorescence in both instances is destroyed by free acids

2. *Nitric acid* dissolves both substances with a yellow color, and the solutions, when treated with excess of ammonia, assume a deep red color. This red coloration may be obtained from even the 1-50,000th of a grain of either substance.

The nitric acid solution of the gelsemium principle, when present in sufficient quantity, has an orange-red color, whereas that of *æsculin* is yellow.

B. They differ more or less in the following properties:

1. *Crystallization*.—The gelsemium compound very readily assumes the crystalline form, even in the presence of comparatively large proportions of resinous matter, whereas *æsculin* crystallizes with some difficulty, even from pure solutions. Thus, the 1-10,000th grain of the former substance, when separated from one grain of solution, is left in the form of needles, whilst crystals can only be obtained from rather strong solutions of *æsculin*, and then usually appear as transparent spherical masses, with some dense tufts of short prisms.

2. *Solubility*.—*a. Water*. The gelsemium substance, when pure, requires 2,912 parts of water for solution, even when excess of the powder is kept in contact with the liquid at a temperature ranging from 18° to 24°C. (65° to 75°F.), for twenty-four hours.

Under like conditions, Merck's *æsculin* dissolved in 401 parts of water. According to Trommsdorff *æsculin* requires 576 parts of water for solution, but according to Minor it dissolves in 300 parts (Gmelin's Hand-Book, xvi, 22).

b. Ether. One part of the gelsemium principle was readily taken up by 330 parts of *ether* of sp. gr. .728, whereas *æsculin* required at least 36,000 parts of the same fluid for solution.

So also, the former principle is rather freely soluble in *chloroform*, whilst the latter is nearly or wholly insoluble in this liquid.

3. *Sulphuric acid* dissolves the gelsemium substance to a more or less yellowish solution, which when warmed in a water oven (if the

substance is pure) undergoes little or no change. *Æsculin* readily dissolves in the acid, but on warming the solution it quickly acquires a brownish or chocolate color and becomes charred.

If a drop of aqueous ammonia be allowed to flow into a drop of the sulphuric acid solution of the gelsemium compound, a dirty white deposit or cloud of very minute crystalline needles separates at the margin of contact of the liquids.

If only a minute drop of the acid be employed and excess of ammonia be avoided, even the 1-10,000th grain of the substance will in this manner yield a very satisfactory deposit of needles. If the drop of liquid be allowed to evaporate, these crystals may be re-examined, even several times, by moistening the residue with a minute drop of water, which will quickly dissolve the ammonium salt, whilst the needles will remain, they being apparently insoluble under these conditions.

This reaction is highly characteristic of the gelsemium principle.

A sulphuric acid solution of *æsculin* under like conditions fails to yield any crystals, unless a comparatively large quantity is present and the mixture be evaporated to about dryness, when transparent nodular masses with some groups of prisms may appear.

4. *Hydrochloric acid* fails to dissolve or act upon the gelsemium compound, even under the heat of a water bath. *Æsculin* is readily soluble in this acid.

In the following liquid reactions the results refer to the behavior of a few drops of 1-100th solutions of both principles.

5. *Nitrate of silver* produces in a solution of the gelsemium principle a copious brownish-yellow precipitate, which soon darkens in color, and finally the mixture becomes deep blue-black, due to the reduction of the silver salt. This reaction will manifest itself, after a time, even in a 1-50,000th solution.

Æsculin yields from a 1-100th solution, a slight dirty yellow precipitate, which remains unchanged for several minutes; it then slowly darkens.

6. *Corrosive sublimate* throws down a copious yellowish precipitate, from which the organic acid quickly separates as large tufts of needles.

Æsculin fails to yield a precipitate or crystals.

7. *Bromine in bromohydric acid* produces a copious green deposit, which quickly acquires a blueish and finally a brownish color.

Æsculin yields a slight yellow precipitate, which becomes yellowish-gray.

8. *Sulphate of copper* causes in a solution of the acid a dirty brown precipitate, which soon assumes a dull red color, and crystalline needles separate.

Esculin yields a blueish white deposit, which undergoes little or no change.

9. *Acetate of lead* (neutral) produces a copious yellow precipitate, which after a time is partly changed into very minute star-like groups of crystals. These are insoluble in ammonia, but readily soluble in acetic acid, being quickly replaced by slender needles of the free acid.

Esculin yields a somewhat similar precipitate, but no crystals were obtained.

10. *Physiological action*.—a. 0.010 gram (about $\frac{1}{8}$ grain) of the gelsemium principle was administered hypodermically to a frog. After a few minutes the eyes were fluorescent, and the animal seemed sluggish; after half an hour it was somewhat excited and apparently weak. No other marked symptoms were noticed during the several hours the animal was observed.

A similar quantity of *esculin* produced fluorescence of the eyes, but no other apparent effect.

b. 0.033 gram ($\frac{1}{2}$ grain) of the gelsemium substance, prepared by precipitation with hydrochloric acid, being injected into the peritoneum of a frog, was quickly followed by violent agitation; the animal became rigid, and reflex action was markedly diminished. In five minutes the animal was apparently lifeless; there was rigidity of the abdominal muscles, which slowly relaxed. After forty minutes, the heart had ceased to beat, was relaxed and not irritable.

c. A similar quantity, injected into the posterior lymph sack, was quickly followed by great agitation and general prostration. In fifteen minutes active voluntary movements appeared, and there was marked fluorescence of the entire eye-ball. After forty-five minutes the heart was found still beating, but ceased fifteen minutes later.

In another experiment, a like quantity caused a complete cataleptic condition and death within ten minutes.

d. 0.033 gram of *esculin* injected into the peritoneum of a similar frog produced no apparent effect, other than a marked fluorescence of the eyes, which continued some fifteen hours.

For these physiological experiments, I am much indebted to Dr. Edward T. Reichert. These results, in regard to the gelsemium principle, confirm in a measure those previously obtained by Dr. Isaac Ott. —(*American Practitioner*, 1877.)

Conclusions.—It is needless to add that the only conclusion from the foregoing comparative results is that the principles examined *are very different substances*. Hence the name *gelsemic acid* will be retained provisionally for the gelsemium principle.

Gelsemine.—As supplementary to our former paper on the subject, some of the more important properties and reactions of gelsemine may be mentioned.

In its pure state gelsemine is a colorless, odorless solid, having a persistent bitter taste. It has not yet been obtained in the crystalline state. At something below 100°C. it fuses to a colorless liquid. Gelsemine completely neutralizes acids, forming salts, most of which are freely soluble in water and alcohol.

The pure alkaloid is soluble, under ordinary conditions, in 644 parts of water. It is freely soluble in ether and in chloroform.

The most characteristic reactions of the solid alkaloid are the following:

1. *Sulphuric acid* dissolves gelsemine with a reddish or brownish color to a solution which after a time assumes a pinkish hue. If the solution be warmed on a water-bath, it acquires a more or less purple or chocolate color.

If a small crystal of *potassium bichromate* be slowly stirred in the sulphuric acid solution, reddish-purple streaks are produced along the path of the crystal. If the potassium salt be used in the form of *powder*, or, as advised by Sonnenschein and Robbins, be replaced by *ceric oxide* (CeO_2 , formerly Ce_3O_4), the purplish or reddish-purple coloration manifests itself more promptly and strongly, and may be obtained from even the one ten-thousandth grain or less of the pure alkaloid. For the detection of these minute quantities, however, it is essential that only very minute quantities of the acid and powder be employed.

This reaction of gelsemine—as remarked by Sonnenschein and Robbins, who first observed it with the cerium compound—resembles somewhat that of strychnine; but these alkaloids could not thus be confounded.

2. *Nitric acid* causes gelsemine to assume a brownish-green, quickly changing to a deep *green*, color, which slowly diffuses itself through the liquid. Almost the least visible quantity of the alkaloid, if touched with only a very minute drop of the acid, will yield this green coloration in a marked degree.

This reaction readily distinguishes gelsemine from strychnine and the other alkaloids.

Solutions of the *salts* of gelsemine are colorless, and have the strongly bitter taste of the alkaloid. These solutions yield precipitates with a number of different liquid reagents, even in some instances when highly dilute; but in no instance is the reaction peculiar to this alkaloid.

Physiological action.—0.008 gram ($\frac{1}{8}$ grain) of gelsemine, administered hypodermically to a cat, caused very marked symptoms in fifteen minutes, and death in one hour and a half.

0.010 gram, given to a frog, produced, after half an hour, great prostration, followed by tetanic convulsions and death in about four hours.

0.033 gram of the alkaloid, in the form of chloride, was injected into the peritoneum of a frog. The animal soon opened its mouth convulsively, the jaws fell at intervals, and there was quickly great muscular prostration. In twenty minutes the body was completely relaxed; the muscles not irritable under pricking; reflex action was greatly diminished, and life seemed to be extinct. On opening the thoracic cavity it was found that the heart had been arrested in diastole and was not irritable.

Gelsemium Poisoning.—The cases of gelsemium poisoning thus far reported have been, with two or three exceptions, the result of accident or ignorance. The preparation of the drug most frequently employed is the *fluid extract*, each fluidounce of which represents 480 grains of the dried root. This preparation, as found in the shops, as we have heretofore shown (this journal, 1877, 151), usually contains .2 per cent. of gelsemine and .4 per cent. of gelsemic acid.

Of *twenty-five* cases of gelsemium poisoning that we have collected, (some private), *thirteen* proved fatal. The *fatal period* varied from *one hour* to about *eight hours*. Very small quantities of the drug may cause death. A case is reported in which a quantity of a tincture equivalent to about *twelve minims* of the fluid extract proved fatal to a child aged three years. In another instance, four doses of *fifteen minims* each of the fluid extract, repeated at short intervals, caused the death of a healthy man in less than four hours after the last dose was taken. So, also, a teaspoonful of the same preparation proved fatal to a woman.

There is no chemical *antidote* known for this kind of poisoning.

The application of *electricity* has in several instances proved very beneficial. In others, the use of *morphine* hypodermically has been attended with good results.

Chemical Analysis.—In gelsemium poisoning the gelsemic acid and the alkaloid are both absorbed, and enter the blood apparently in the proportion in which they are found in the plant. Hence, in poisoning by the drug, it becomes necessary to direct the examination for the absorbed poison to the recovery of both these principles. This is the more important, since the acid is apparently not much less poisonous than the alkaloid, and so readily reveals its presence by its fluorescent properties.

The general method for the recovery of strychnine and like substances from the blood and tissues is about equally applicable for the recovery of the gelsemium principles. As these substances are readily soluble both in ether and chloroform, either of these liquids may be employed for the extraction. The gelsemic acid would, of course, be found in the ether extract from the prepared solution, while it still had an acid reaction; whilst the alkaloid would be extracted from the solution after it had been rendered alkaline.

In applying the tests for gelsemic acid to the ether residue from the acid solution it should be remembered that although the reaction of the nitric acid and ammonia test is common to gelsemic acid and *æsculin*, yet when obtained from an *ether* extract, it is characteristic of the former substance, since *æsculin* is not extracted by ether.

The blood and liver of a cat which had been killed, after several hours, by the drug, were examined, in the main, after this general method. The first ether extract, in both instances, was distinctly fluorescent, and on evaporation left the gelsemic acid, in part at least, in its crystalline state. The true nature of these crystals was readily established by the appropriate tests. So, also, about equally satisfactory evidence of the presence of gelsemine was obtained from the ether residues from the alkaline solutions.

As a conclusion from these and other similar results, it would appear that in gelsemium poisoning evidence of the presence of the poison in the blood may be more readily and fully obtained than in the case of any of the other vegetable poisons.

Philadelphia, June, 1882.

NOTES ON THE USEFUL AMERICAN MYRTLES.

BY JOHN M. MAISCH.

Read before the Pennsylvania Pharmaceutical Association at Altoona,
June 14.

After referring to the statement in Mr. Riise's paper on bay rum (see p. 278, June number) relating to the varieties of the bayberry tree, scarcely to be distinguished botanically, the author continues:

There being a large number of myrtles indigenous to the West Indies and many also to South America, it may not appear inappropriate to give a brief account of those American species which yield useful and more or less medicinal products. Since by far the largest number of these plants possess aromatic properties, and many of them are also astringent, it may be presumed that the majority of them could be employed medicinally; but in this sketch I shall confine my remarks to those only which have, at various times, attracted some attention in Europe or in this country.

The order Myrtaceæ has affinities, more or less intimate, with a number of other orders, and its limits are variously defined by different botanists, so as to embrace a larger or smaller number of tribes or suborders. Between 1700 and 1800 species belong to it, all of which, with but few exceptions, inhabit tropical countries.

The *Barringtoniæ*, comprising tropical trees with opposite undotted leaves, are at present generally separated from the Myrtles. They are often emetic and stupefying, or bitter and astringent, and in some species an unpleasant odorous principle is prevalent.

The suborder *Granatæ* or *Punicæ* contains only a single species, the well known pomegranate, which is indigenous to Western Asia, from Northern India to the Mediterranean, and is now cultivated everywhere in subtropical countries and the warm temperate zone. It is destitute of aromatic properties, the bark of the root and trunk as well as the rind of the fruit being anthelmintic and containing considerable tannin. Some botanists place this tree into a separate natural order, while others have united it with the order of Lythraceæ.

The suborder *Lecythidæ* is likewise free from aromatic properties and is remarkable for the large woody fruits, which in some species open by a kind of lid, on which account they have been called *monkey-pots*. The seeds contain a considerable quantity of fixed oil, sometimes over fifty per cent., and are often edible, being of an almond like flavor, though those of a few species are reputed to be more or less

deleterious in their raw state. The well known *Brazil nuts* or *Para nuts*, known as *touka* in Cayenne, as *juvia* on the Orinoco, and as *castanha do Pará* in Brazil, are the seeds of *Bertholletia excelsa*, *Kunth*. The so-called *Sapucaya nuts* are produced by *Lecythis Zabucajo*, *Aublet*, and of nearly the same flavor are the seeds of *Lecythis Ollaria Lin.* The fruit of *Couroupita guianensis*, *Aublet*, is globular, attains a diameter of six or eight inches and is known as *canon ball*, *boulet de canon*; it contains in its nearly ripe condition a sweet acidulous pulp, furnishing a refreshing beverage, useful in febrile diseases. These trees are indigenous to South America.

The suborder *Chamelaucieæ* has, like the following suborders, evergreen and mostly glandular-punctate leaves. The plants known as *fringe-myrtles* are shrubby, of a heath-like aspect, with small leaves, are indigenous to Australia and are not used medicinally.

The suborder *Leptospermeæ* comprises, with very few exceptions, Australian trees and shrubs, with opposite or alternate leaves. The volatile oil of one species, *Melaleuca minor*, *Smith*, is the well-known *oil of cajuput*. The volatile oil distilled from the leaves of *Mel. ericæfolia*, *Sm.*, *Mel. linariæfolia*, *Sm.*, *Mel. Leucadendron*, *Lin.*, and perhaps of other species, are very similar. The last-named species is known in Australia as *tea tree*, because the leaves are employed like tea; the *white tea tree* is *Mel. genistæfolia*, *Sm.* The leaves of different species of *Leptospermum*, like *L. scoparium*, *Sm.*, *L. Thea*, *Willdenow*, and others are similarly used.

But the suborder has attracted universal attention through the *Eucalyptus globulus*, *Labillardière*, which through its rapid growth, and perhaps also through the exhalation of its volatile oil, has been found useful in subtropical marshy countries for destroying malaria. The leaves of all species of this genus yield volatile oils, which sometimes differ widely in odor and composition. Several species yield astringent exudations, drying into a kino-like substance; the exudation of others contains more gummy matter, and of one or two species it is of a saccharine nature; the bast fibres of certain species have been found serviceable in the manufacture of paper.

Of the suborder *Myrtææ*, there are not less than 53 species described by Grisebach, growing in the British West Indian islands, all of which are more or less aromatic. The number growing in all the West Indian islands and in South America is much larger. The species best known throughout the civilized world is doubtless the clove, *Caryophyllus*

aromaticus, *Linné* (s. *Eugenia caryophyllata*, *Thunberg*; *Myrtus Caryophyllus*, *Sprengel*) which, though originally indigenous to the Mollucca Islands is now perfectly naturalized in the West Indies and South America. The unexpanded flower-buds, which constitute the cloves of commerce, contain, besides a considerable amount of tannin, an aromatic volatile oil, of which the eugenol or eugenic acid constitutes the most important part, and very similar constituents are met with in the less aromatic pedicels, known in commerce as *clove stalks*, and in the fruit known as *mother cloves* and *anthophylli*. That the allspice, the fruit of *Pimenta vulgaris*, *Wight et Arnott*, s. *Eugenia* (*Myrtus*, *Lin.*) *Pimenta*, *De Cand*, likewise contains a volatile oil, chemically identical with the oil of cloves, is well known; besides the fruit, the leaves are employed in the West Indies as a spice and in medicines, and the young straight shoots of the plant are largely exported to be used for walking canes. The same volatile oil seems to be present in the closely allied *Pimenta* (*Amomis*, *Berg*) *Pimento*, *Grisebach*, which differs from the preceding chiefly by its five-lobed calyx and by its longer ovate-oblong (instead of globular) fruit. The bayberry tree of the West Indies, *Pimenta acris*, *W. et A.*, has, likewise, pentaphyllous flowers and a more ovoid fruit, however the coriaceous leaves are distinctly reticulate on the upper surface, and less distinctly so beneath, while the preceding species does not show any projecting veins above. The typical form of the bayberry tree has the young branchlets, somewhat four-angled, while the variety *pimentoides*, which was formerly regarded as a distinct species, *Myrcia* (*Amomis*, *Berg*), *pimentoides*, *DeC.* s. *Myrtus* (*Eugenia*) *citrifolia*, *Poir.*, has acute branchlets decurring from the petioles, and usually broader and more obovate leaves. The oil of bay, distilled from the leaves of the species mentioned has been in the American market for about 20 years; that it contains eugenol was proven by Mr. R. Rother in 1876 ("Chic. Pharmacist p. 130), and this was corroborated by Prof. Markoe in 1877 ("Proc. Am. Phar. Assoc., p. 435). The fruit contains the same volatile oil, and not unlikely also the flower-buds; at least the tree is known as *clove* in some of the West Indian islands (*Grisebach*). These species and varieties possess almost identical stimulating properties, and may be substituted for one another in their applications as medicine or as spice, almost indiscriminately, or at least as far as the difference in flavor will permit.

The clove-like odor is not confined to the species mentioned before,

but is met with in other plants and doubtless depends upon the presence of eugonol. *Eugenia* (*Myrtus*, *Gomez*) *pseudo-caryophyllus*, *DeC.*, and *Calyptranthes aromatica*, *St. Hilaire*, both indigenous to Brazil, and known there as *craveiro da terra*, possess this flavor, and the young flower-buds, particularly those of the latter, have been recommended as a good substitute for cloves; a clove-like flavor is observed in all its parts, and the ovate fruit is extensively employed both for culinary purposes and also in medicine.

While it is undoubtedly true that botanical relationship is often indicative of similar properties and composition, yet the odorous compounds met with in the volatile oils of nearly related species are often very dissimilar, if not in relation to their chemical nature, at least in their sensible properties, more particularly in their odor. Thus, for instance, *Myrcia* (*Myrtus*, *Vahl*) *coriacea*, *DeCand.*, which grows in many of the West Indian islands, so closely resembles the bayberry tree that it has been confounded with it by as thorough a botanist as Swartz, but the leaves have a lemon-like odor, entirely distinct from the allspice-like flavor of the former, and it is very obvious that the volatile oil or the spirit distilled from them must have very different properties from those of good oil of bay or of bay rum. The leaves, like those of other myrtles, vary considerably in shape and are either oval, roundish-elliptic or obovate, obtuse or emarginate, and usually opaque, though marked with impressed dots, some of which become finally pellucid; the veins are not conspicuous and are usually joined near the revolute margin. There are several varieties differing in the pubescence of the branchlets and petioles, in the length of the peduncles, and the number of flowers borne by them. The leaves possess antiseptic and astringent properties, the bark is employed for tanning, and the wood is used for dyeing yellow, green and brown.

Eugenia (*Myrtus*, *Swartz*) *glabrata*, *DeCand.*, is acidulous aromatic in all its parts, more particularly the black oblong berries.

Eugenia (*Myrtus*, *Swartz*) *procera*, *Poir.*, which is found in Jamaica and adjacent islands, and also in Southern Florida, has pellucid-punctate leaves which finally become leathery and opaque and then have but a slight odor, while the flowers are very fragrant.

Eugenia (*Myrtus*, *Sprengel*) *fetida*, *Persoon*, of Guiana has leaves possessing a disagreeable odor, a property rarely met with among the myrtles.

Ananomis (*Myrtus*, *Swartz*; *Eugenia*, *Willdenow*) *fragrans*, *Grise-*

bach, grows in mountainous regions from Jamaica southward to Guiana; its rigid variable leaves are of a strong balsamic flavor, and are employed both externally and internally. The variety *cuneata*, s. *Eug. emarginata*, *Macfillan*, is known as *zebra wood*.

The odor of the flowers of *Eugenia* (*Myrtus*, *Swartz*) *virgultosa*, *De Cand.*, indigenous to Cuba and Jamaica, resembles that of rhubarb.

Eugenia (*Myrtus*, *Swartz*) *disticha*, *De Cand.*, is known in Jamaica as *wild coffee*, because the red ovoid berries, which are about $\frac{1}{4}$ inch long, resemble the fruit of coffee and the fresh seeds have a similar taste.

Eugenia (*Myrtus*, *Swartz*) *Gregii*, *DeCand.*, has oblong or roundish-obovate berries of a leathery texture and a strongly acrid-aromatic flavor. Acrid aromatic properties are likewise found in the root and seeds of *Eugenia* (*Myrtus*, *Sprengel*) *angustifolia*, *Lam.*, which grows in San Domingo.

The yellow depressed-globose berries of the Brazilian *Eugenia* (*Myrtus*, *Martius*) *dysenterica*, *DeCand.*, are of an agreeable acidulous taste, but are apt to produce diarrhœa. The red or yellow berries of the West Indian *Eugenia floribunda*, *West*, are sweet and acidulous, are eaten raw and cooked, and on fermentation yield a pleasant vinous beverage. Eatable berries are also produced by several other West Indian species of *Eugenia*, the most important of which appear to be *Eugenia* (*Myrtus*, *Swartz*) *ligustrina*, *Willd.*, s. *Myrtus cerasina*, *Vahl*, with a black two-seeded fruit called *pitangueira do mato* in Brazil; *Eugenia* (*Myrtus*, *Swartz*) *lineata*, *De Cand.*, with a scarlet-red cherry-like but several-seeded fruit; and *Eugenia uniflora*, *Lin.*, s. *Eug. Michelii*, with a red-furrowed one-seeded fruit, which is known in some parts as *Cayenne cherry* and in Brazil as *pitangueira*; the last named species is also distributed over a considerable portion of tropical South America, and has been naturalized in the East Indies. In like manner are also used the violet-purplish plum-sized berries of the Brazilian *Eugenia* (*Myrtus*, *Martius*) *cauliflora*, *De Cand.*, known as *jabuticaba*.

One of the myrtles of tropical America has been introduced into and naturalized in most other tropical countries, where it is highly valued on account of its fruit, which resembles a medium-sized pear, with a downy, veined, brittle and thin rind, and containing a whitish, yellowish or reddish pulp, of a very agreeable sweet, acidulous and aromatic flavor. The fruit is known as *bay plum*, *guava* or *guayava*,

and in Brazil as *araçá mirim* and *araçá goiaba*. It comes from a small tree, the *Psidium* Guava, *Raddi*, under which name two or three nominal species are comprised, chiefly distinguished by the shape of the fruit; this is either pyriform or globular, the latter apple-shaped or red guava being regarded as rather inferior to the former, or white guava. The unripe fruit is astringent, and is employed like other astringents; the young leaves and buds have similar properties, also the root and the bark, and are used both internally and externally. The white guava is most esteemed for eating in the raw state; but the pulp of both varieties is used in the West Indies in the preparation of two kinds of preserve, which are known as guava jelly and guava cheese, and furnish a not unimportant article of commerce.

The dark red spherical, well-flavored fruit of *Psidium* *Cattleianum*, *Sabine*, has the size of a large plum, and on account of its purplish pulp is known as purple guava, and in Brazil as *arácaseiro do campo*; it is indigenous to Brazil and naturalized in China.

Psidium guineense, *Swartz*, is cultivated in the West Indies for its somewhat smaller, dark yellow and internally red berry, and the fruit of *Eugenia* (*Myrtus*, *Sprengel*) pseudo-*psidium*, *Jacquin*, is esteemed there under the name of *bastard guava*.

Psidium montanum, *Swartz*, the *mountain guava* of Jamaica, has a globular fruit, scarcely $\frac{1}{2}$ inch in diameter, which, like the flowers, has a bitter almond odor. A species of St. Vincent *Psidium* *Guildingianum*, *Grisebach*, with small berries, only $\frac{1}{4}$ inch thick, has in its habit considerable resemblance to *Myrcia coriacea* and *Pimenta acris*, but the rigid leaves are devoid of pellucid dots.

Campomanesia (*Psidium*, *Aublet*) *aromatica*, *Grisebach*, has yellow globular eatable berries, and a foliage of a balm-like odor. The similar fruit of *Campomanesia lineatifolia*, *Ruiz et Pavon*, is known in Peru as *palillo*, and that of *Camp. cornifolia*, *Kunth*, in New Grenada, as *guyavo de Anselmo*.

In this connection should also be mentioned the *rose apple* and *Malay* or *Otaheite apple*, which have been naturalized in the West Indian islands, and there, as in tropical Asia, their native country, are highly valued on account of their agreeable taste and rose-like odor. The former, *Jambosa vulgaris*, *De Cand.*, s. *Eugenia* (*Myrtus*, *Kunth*) *Jambos*, *Lin.*, is a globular or oval yellowish or reddish berry, about $1\frac{1}{2}$ inch in diameter; the latter, *Jambosa* (*Eugenia*, *Lin.*; *Myrtus*, *Sprengel*) *malaccensis*, *De Cand.*, is pear-shaped or top-shaped, 3 or 4

inches long, of a crimson or blackish-red color externally, and with a white, juicy pulp.

The bark and leaves of both species possess strongly astringent properties, and the seeds are aromatic and acrid. The fruit of several other species indigenous to tropical Asia is employed there like those mentioned.

The jambolana, *Syzygium* (*Eugenia*, *Lam.*; *Calyptranthes*, *Willd.*) *Jambolanum*, *De Cand.*, is also naturalized in Jamaica and other West Indian islands. The dark red oval and somewhat curved fruit is of the size of a large cherry, has an astringent, acidulous taste, and is employed in gargles; the bark, notably that of the root, is astringent and aromatic. Several other species of this genus, mostly indigenous to tropical Asia, bear eatable berries.

The plants of the genus *Myrtus*, to which the frequently cultivated common myrtle of Southern Europe, *Myrtus communis*, *Lin.*, belongs, have, likewise, aromatic and astringent properties, and their berries are in some cases eatable, like *Myrtus Luma*, *Mill.*, whose fruit is very palatable; *Myrtus microphylla*, *Humb. et Bonpl.*, the red berries of which are of the size of a pea and very sweet, and *Myrtus Ugni*, *Molina*, which has thicker brown-red berries, of a faint rosemary odor; these species are indigenous to Chili and Peru, and the leaves of the *ugni* are used as a substitute for tea. The *guayavo arayan* of the Orinoco valley is *Myrtus salutaris*, *Kunth*, the root of which is highly valued as an astringent.

Somewhat similar properties are possessed by a Chilian plant called *cheken* or *chekan*, which enjoys a local reputation, and the use of which in Europe and in North America has been recently revived. *Eugenia Cheken*, *Molina*, is a small shrub, about four feet high, with a rough, brown, strongly astringent bark; the leaves are sessile, about an inch long, elliptic or roundish, somewhat narrowed at both ends, delicately feather-veined, light green and smooth; the peduncles are axillary and terminal, five- or six-flowered; the berries are globular, about $\frac{1}{3}$ inch thick, externally black, and contain two somewhat heart-shaped seeds. The bark and the leaves have been employed internally in indigestion, diarrhoea and various other affections of the bowels and kidneys, and externally, in the form of fomentations, in ophthalmic inflammations, rheumatic and other pains, and more recently, as inhalations of the vapors from the aqueous infusion, in bronchitis, laryngitis and diphtheria.

Very few myrtles are indigenous, but none peculiar to the United States. The five species, enumerated in Chapman's Flora, are small trees, confined to Southern Florida. They are *Eugenia dichotoma*, *De Cand.*; *Eug. procera*, *Poir.*, *Eug. monticola*, *De Cand.*; *Eug. buxifolia*, *Willd.*, and *Calyptranthes* (*Myrtus*, *Lin.*) *Chytraculia*, *Swartz*. Not a single myrtle has been found indigenous to California, though the climate is well suited for the growth of different species of *Eucalyptus*, and doubtless of other genera of this interesting and useful natural order. The States bordering the Mexican Gulf may likewise be adapted for the acclimatization of some of the numerous myrtles.

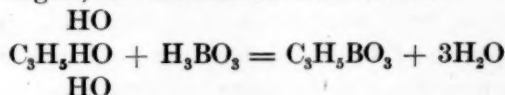
NOTE ON BOROGLYCERIDE.

BY THOMAS D. McELHENIE.

Read before the Kings County Pharmaceutical Society, June 13th.

In a paper read some time ago before the Society of Arts, London, Prof. F. S. Barff announced the new antiseptic, under the above title, as prepared and tested by him. The paper and the subsequent discussion were confined to domestic and culinary uses of the substance in the preservation of all kinds of food-products, raw and cooked, and brought out a great many interesting facts. For instance, cream prepared by adding an ounce of boroglyceride to one quart, has been sent from London to Zanzibar, passing through the tropics and arriving in good condition; also to Jamaica. It occurred to me, on reading the account in the "Scientific American" Supplement, that an article of such valuable antiseptic properties, and withal so harmless in itself, would prove of great value in pharmacy, and probably in medical and surgical practice. Two or three prominent surgeons of this city have it now under investigation as a dressing for wounds. The preparation is not a secret or proprietary article in any sense, the author having given it for public benefit, and the process is as follows: Ninety-two parts of pure glycerin are heated to about 150°C. (302°F.) and sixty-two parts of pure boracic acid in powder are gradually added. Steam is given off by the formation of water, and the mass loses weight. The operation, in quantities of five pounds or more, requires about a day to complete, as the viscosity of the melted mass allows the steam to bubble out very slowly. It is known to be finished when it ceases to lose weight and dissolves freely in water at

ordinary temperature. The ingredients are used in the proportion of their atomic weights, and the reaction is as follows:



The hydroxyls of the glycerin being replaced by the boric oxide, unite with the hydrogen liberated therefrom to form water, and this passes off as vapor. It amounts to a little over one-third of the whole mass, or 54 parts in 154, the yield being 100 parts for each 92 parts of glycerin employed, and consisting of 41 parts of glyceryl and 59 parts boric oxide. The cooled product is solid, brittle, and transparent, has a light amber color, and a shining fracture. These data are true of the preparation as made in a porcelain kettle over a direct flame. The heat of a water bath is not sufficient to effect the combination. It could probably be made on a large scale in jacketed kettles by the use of superheated steam, and in this way would doubtless be lighter in color. It is freely soluble in warm water, sparingly soluble in alcohol at 60°F., and in 5 parts at 120°; insoluble in ether and chloroform at 60°F. The strong alcoholic solution will probably prove an excellent means of impregnating lint, cotton and gauze with boroglyceride for surgical use.

If the compound is melted in a water bath, and an equal weight of glycerin added, a dense clear mixture is obtained which remains fluid on cooling, and is a very convenient form for many uses, being 50 per cent. by weight of the antiseptic. This glycerol, as we may term it, will mix clear with an equal volume of alcohol. A 5 per cent. solution of boroglyceride is not affected by tannin, tincture of chloride of iron, Monsel's solution, or the mineral acids. These points may prove useful in treating diphtheria, in which an antiseptic spray is often employed.

As might be expected, boroglyceride is hygroscopic, soon becoming damp and greasy on an exposed surface.

A convenient form for dispensing will be found that of 2-ounce cakes, moulded in oiled camphor ice tins. One or more dissolved in the requisite quantity of water will furnish readily a solution of any desired percentage. These cakes should be wrapped in wax paper and tin foil as soon as cold, to prevent hydration.

As to practical tests of this substance in pharmacy, it is too soon to have acquired much information on this head. However, I have a

few specimens of readily putrescible substances, tending somewhat to show its power. The contents of two eggs, with 2 fluidrachms of a 10 per cent. solution, have kept sweet from May 22d. The expressed juice of two pounds of finely-chopped lean beef, with fat and pulpy matter which went through the press, has kept sweet from May 29th with $\frac{1}{2}$ ounce boroglyceride. This shows the feasibility of preparing a superior nutriment for invalids, and deserves fuller investigation. Mucilago Acaciae, U. S. P., substituting the 5 per cent. solution for water, made June 1st, is quite sweet. 120 grains of French gelatin were dissolved in 16 ounces of water on June 5th, and divided in two portions, one being left unprotected, while to the other 1 dram of boroglyceride was added. The latter is quite good at eight days old, while the former is becoming putrid. Boroglyceride will keep infusions, decoctions, solutions of the alkaloids, etc., from spoiling. Fruits and fruit juices for use in beverages can be kept in this way without sugar, and made into syrups at any time, thus securing all the flavor. It also furnishes an excellent means of preserving anatomical specimens at a very small cost. The skin and tissues are not shrunken as they are in alcohol.

You will see on the table some specimens illustrating the foregoing remarks. Among the most interesting to surgeons are absorbent cotton and crinoline saturated with a 20 per cent. alcoholic solution of boroglyceride.

P. S.—After the foregoing was written I saw the statement in "Oil and Drug News," that boroglyceride had been patented at Washington under the title of Barff's Preserving Compound. I presume that this is to secure to the inventor the sole right to use it in preparing and transporting beef on a large scale from North or South America to Great Britain. This presumption is strengthened by the fact that another process, known as the Jones Patent, is being tested in London. This consists in injecting into the aorta of animals, after stunning them with a blow, but before death, of a solution of boracic acid. I do not imagine that the inventor would trouble any one making, vending, or using the antiseptic for medical, surgical, or pharmaceutical uses. I have written to the inventor, and may be able to report on this point at our September meeting.

Brooklyn, June 12, 1882.

SEPARATION OF ETHER.

BY C. J. H. WARDEN.

In separating quinine and amorphous alkaloids from the mixed cinchona alkaloids by agitation with ether, the subsequent removal of the ethereal layer from undissolved alkaloid and from the aqueous stratum is an operation of some little difficulty. If the ether be decanted off, or taken up by a pipette, small quantities of solid matter, as well as watery fluid, are also likely to be removed, while the ordinary separating funnels do not facilitate the operation. To obviate these difficulties the following apparatus was devised. The apparatus is essentially a filtering syphon, and consists of a syphon-shaped tube of thick glass, of small bore, on the shorter limb of which a small funnel has been blown, which is provided with a narrow projecting lip, and with a ground flat rim, while the other end of the larger limb is drawn out. The shorter limb is mounted on a cork, in which there is a second aperture, which carries a small bent tube. The cork fits the bottle in which the operation of agitation with ether has been conducted, and which should be long and narrow. To use the apparatus the funnel is lightly stuffed with a few fragments of cotton wool, and a piece of filter paper tied over the mouth, the flange preventing it from slipping, and the superfluous paper is cut off short. The funnel is then introduced a short distance below the surface of the ether, and the cork fixed. The apparatus has now somewhat the appearance of a wash-bottle, save that the tube from which the liquid escapes is three or four times the length of the tube which is immersed in the liquid. On gently blowing through the open end of the small tube—which may conveniently have a piece of india rubber tubing attached—the ether is forced through the filter and fills both limbs of the syphon, and then continues to flow automatically into a reservoir placed for its reception. As the ethereal stratum diminishes, the tube carrying the funnel is depressed until its flat surface is within a line or so from the surface of the aqueous layer, and is engaged in the precipitate. When this occurs, air has again to be blown through the small tube, and this is continued until drops of ether escape only at long intervals. The cork carrying the tubes is then removed, fresh ether poured into the bottle, agitated, and the series of operations described above again performed; and this may have to be repeated a third time. When it is judged the precipitate has been exhausted of principles soluble in ether, the syphon is removed, and any particles adherent to the base or sides of

the funnel brushed off, and the funnel with its attached filter paper, as well as the exit end of the syphon, washed with a small quantity of ether or alcohol. Obviously the apparatus may be used for all operations in which ether, etc., is used for the separation of alkaloids or fatty principles. By having a third aperture in the cork, and fitting into it the delivery tube of a burette, the apparatus could be employed in certain volumetrical analyses. Under such circumstances the tube carrying the funnel should be depressed until the mouth of the funnel is almost in contact with the bottom of the bottle, and the necessary agitation of the fluid, after addition of the precipitant, would then be effected by drawing air through it by the small bent tube.—*Phar. Jour. and Trans.* May 6, 1882; *Jour. of Soc. of Chem. Indus.*

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

Two New Methods for the Detection of Cadmium in the Presence of Copper. By Anton Orlowsky.—1. The solution, from which the bismuth has been removed, is acidulated with hydrochloric acid, stannous chloride added until decoloration ensues, and then heated to boiling with precipitated sulphur, whereby the entire amount of copper is precipitated as cuprous sulphide; from the filtrate the tin is precipitated by an excess of ammonia, filtered, and the filtrate tested with ammonium sulphhydrate for cadmium.

2. The solution, freed from bismuth, is acidulated with hydrochloric acid, sodium hyposulphite is then added and the mixture boiled until the yellow precipitate which is first produced changes to a dark brown; the filtrate is then tested for cadmium.—*Chem. Zeitung*, No. 24, 1882, p. 475, from *Ztschr. Anal. Chem.*, 21, p. 214.

Distinction of Bee Honey from Artificial Honey. By Dr. Planta.—For the preparation of artificial honey, glucose and cane sugar syrup are principally employed. If such a manufactured honey be mixed with alcohol, a white precipitate of dextrin is thrown down, whilst bee honey by the same treatment only becomes strongly turbid. The most certain means of recognition, however, is the estimation of the sugar, the amount of grape sugar being first estimated directly, and finally after boiling with 2 per cent. sulphuric acid.—*Ibid.*, from *Deutsch. Zucker. Ind.*, 1882, p. 388.

Estimations of Ash.—The tedious operation of the estimation of

ash in flour, wine, beer, extracts, etc., may be much facilitated by perfecting the combustion of the previously carbonized residue in a current of oxygen. The oxygen apparatus may consist of a test-tube, in which is placed a mixture of potassium chlorate and manganese dioxide, and the upper portion of which is filled with glass-wool, in order to prevent the escape of dust-like particles. The oxygen is conveyed through the perforated lid of a Rose crucible, the latter being first heated, and finally the test tube. As soon as oxygen passes over, a violent combustion is produced, and the ash is very soon burned to whiteness.—*Ibid.*, p. 474, from *Pharm. Centralhalle*, 3, p. 188.

Reactions of Aloes. By Dr. Wilhelm Lenz.—By the examination of a number of specimens of authentic varieties of aloes, and a comparison of their reactions with those of extracts of rhubarb, senna, frangula bark and buckthorn berries, the author found that the reaction of Bornträger, appearance of a red coloration by the addition of ammonia to the benzin extract of the liquid, is not characteristic for aloes, as the other named substances, when treated in the same manner, also produce red colorations which cannot be plainly distinguished from those obtained with aloes. The behavior toward ferric chloride and iodinated potassium iodide, which Klunge has recommended, the author also considers unreliable for the detection of aloes. The reaction of Bornträger, which is attributed to the presence of aloetin, is also produced by chrysophanic acid, and the former and the latter, according to their reactions with solution of potassium hydrate and sulphuric acid (which produce first a red and then an orange coloration), and by fusion with caustic potassa, which is colored blue by both aloetin and chrysophanic acid, would appear to be identical.

Reliable results for the detection of aloes are obtained by the procedure of Dragendorff, which consists in the precipitation of the solutions by neutral acetate of lead, removal of the excess of lead by sulphuric acid, purification of the solution by agitation with ether, and extraction of the aloin with amylic alcohol. In the residue obtained by the subsequent evaporation of the amylic alcohol the aloes may be detected with certitude; the corresponding residues from rhubarb, senna, frangula bark and buckthorn berries are much smaller in amount and show none of the reactions which characterize aloin.—*Ibid.*, p. 475, from *Ztschr. Anal. Chem.*, 21, p. 220.

Potassio-bismuthic Iodide as a Reagent for Alkaloids. By F. Maugni.—In the course of a forensic examination the author observed that the above-named reagent, as recommended by Dragendorff on account of its sensitiveness, and which he had prepared according to the Russian method, gave also with pure water a turbidity. It was then prepared by the author, by the admixture of 3 parts of potassium iodide, 16 parts of bismuth iodide, and 3 parts of hydrochloric acid. When prepared in this way it gave no turbidity with water, was very sensitive, and permitted even, what has been refuted by Dragendorff, the discrimination of the individual alkaloids by means of the color and behavior of the precipitate.—*Ibid.*, No. 25, 1882, p. 494, from *Gazz. Chim.*, 12, p. 155.

Detection of Sodium Salicylate in Milk.—Girard mixes 1 liter of milk with 1 liter of warm water, then adds 5 drops of acetic acid, filters, and agitates the liquid with $\frac{1}{2}$ liter of ether; the ether is then decanted, and allowed to evaporate spontaneously. If salicylic acid were present, the residue gives with one drop of a 1 per cent. solution of ferric chloride a violet coloration.—*Chem. Ztg.*, 6, p. 385, from *Giorn. Farm. Chim.*, 31, p. 124.

The Constituents of the Cola Nut, Gourou or Ombene (seeds of *Sterculia acuminata*, Pal. de Bavois).—Heckel and Schlagdenhauffen have submitted the cotyledons of the cola nut to analysis, with the following result. 100 parts were found to contain:

Caffeine,	.	.	.	.	2.348	Substances soluble in chloroform.
Theobromine,	.	.	.	.	0.023	
Tannin,	.	.	.	.	0.027	
Fatty matter,	.	.	.	.	0.585	
Tannin,	.	.	.	.	1.591	Substances soluble in alcohol.
Cola red,	.	.	.	.	1.290	
Glucose,	.	.	.	.	2.875	
Fixed salts,	.	.	.	.	0.070	
Starch,	.	.	.	.	33.754	
Gum,	.	.	.	.	3.040	
Coloring matters,	.	.	.	.	2.561	
Protein substances,	.	.	.	.	6.761	
Ash,	.	.	.	.	3.325	
Water,	.	.	.	.	11.919	
Cellulose,	.	.	.	.	29.831	
					100.000	

This analysis shows that the cola nuts are richer in caffeine than the most esteemed varieties of coffee, and that this base is contained

therein in a perfectly free state, not combined, as in the coffee, with an organic acid; they contain also an appreciable quantity of theobromine, which increases the properties of the caffeine and acts syngenetically with this active principle. It is also an important fact that they contain a notable quantity of glucose, of which cacao contains no trace; the quantity of starch is also thrice that contained in the seeds of theobroma, which explains their nutritive value; the amount of fatty matter, however, is very slight, compared with that contained in the cacao. There exists further a special variety of tannin, which resembles caffeo-tannic acid, and a red coloring matter (cola red) very closely related to that denominated by Payen as cacao red. The physiological examination of this seed has shown that its unique action depends upon the caffeine and theobromine which it contains.—*Rep. de Pharm.*, 1882, No. 4, p. 463.

On the Gloriosa superba. By C. J. H. Warden.—The roots of *Gloriosa superba*, an Indian plant of the natural order Liliaceæ, when collected before the period of flowering possess a deep yellow color. The author has isolated from the aqueous extract of the root a bitter principle, which is denominated *superbin*. It is obtained by extracting the alcoholic extract with water acidulated with acetic acid, neutralizing the liquid by carbonate of sodium, filtering, acidulating with sulphuric acid, and precipitating by tannin; the precipitate treated with lime, dried, and extracted with alcohol, yields to the latter the *superbin*.

The *superbin* which, moreover, does not present the characters of a definite principle, is an energetic poison. The author advances the hypothesis of its identity with the poison of *Scilla maritima*.—*Jour. de Phar. et de Chim.*, 1882, p. 523, from *Ber. d. Deutsch. Ch. Ges.*, 14, p. 1111. *aconine*

On Conicine and its Compounds. By J. Schorm.—The author, having had occasion to prepare considerable quantities of conicine, has made several observations upon the preparation, and has succeeded in obtaining in a crystalline form a certain number of salts of the alkaloid in question.

The procedure of preparation which appears to be the best is the following: The fruits of hemlock are moistened with hot water, and, after having been allowed to swell, are treated with a little carbonate of sodium; the caustic alkalies must not be employed. For 100 kilograms of the fruit 4 kilograms of carbonate of sodium are employed,

and, after having rendered the mixture homogeneous by prolonged agitation, it is distilled by the aid of steam, under a pressure of about 3 atmospheres. The distillation is continued as long as the distilled liquid has an alkaline reaction.

From the obtained product the cicutine separates in an oily condition when ripe fruits have been employed, and more fluid when derived from less mature fruits. It is then neutralized by hydrochloric acid, evaporated to the consistence of syrup, the residue agitated with twice its volume of strong alcohol, and the precipitated chloride of ammonium separated. After the removal of the alcohol by means of a water-bath an equivalent quantity of caustic soda is added, and the mixture agitated with ether, which dissolves the impure conicine. Under the influence of energetic refrigeration the ethereal liquid separates long needles of conhydrine. The last-mentioned principle passes over by distillation with ether, and may be thus collected, while the conicine remains behind.

Another method of preparation consists in exhausting the fruits with water acidulated with acetic acid, and in evaporating the extract in a vacuum to the consistence of a syrup. To the product magnesia is then added, and the whole agitated with ether. By this method a little less alkaloid is obtained, but it is more pure, and yields more readily crystallizable salts.

By the two methods the alkali which remains after the distillation of the ether is dried by carbonate of potassium, and distilled from an air-bath; 10 parts in 100 pass over between 110° and $168^{\circ}\text{C}.$, 60 parts in 100 between 168° and $169^{\circ}\text{C}.$, which is the pure conicine, and 20 parts in 100 between 169° and $180^{\circ}\text{C}.$

Pure conicine is colorless and remains colorless by exposure to light. Its specific gravity is 0.886. It dissolves in the cold one quarter of its weight of water, and liberates the same again on heating; it is itself soluble in 90 parts of water.

The author has studied, in connection with other chemists, the *hydrochlorate* and *hydrobromate of conicine*; these two salts are anhydrous, isomorphous, and crystallize in right rhombic prisms.

The *hydriodate of conicine* is anhydrous; it can only be obtained crystalline with perfectly pure hydriodic acid, which is entirely free from iron. This salt crystallizes, by slow evaporation, in large flat needles, unalterable by exposure to light and air. It also forms oblique rhom-

bohedral prisms. When gently heated in a vacuum it sublimes similarly to sal ammoniac.

The *acid tartrate of conicine* is obtained by the combination of the calculated amount of base and acid; by the spontaneous evaporation of its solution it forms right rhombohedral prisms, containing two molecules of water of crystallization.

The *neutral oxalate of conicine* forms indeterminable crystals, in mamillated groups, and contains no water of crystallization.

The author has also obtained a borate, carbonate and picrate of conicine, and double salts with sulphate of aluminium and chloride of zinc, but these compounds have not been analyzed.—*Ibid.*, pp. 526 to 528, from *Ibid.*, 14, p. 1765.

NOTE ON THE CINCHONA ALKALOIDS.

BY O. HESSE.

About the middle of March in last year I discovered in the mother liquor of homocinchonidine sulphate a new alkaloid which presents several points of resemblance to homocinchonidine as well as to cinchonidine, but differs from both those alkaloids, especially in its behavior towards potassium permanganate in acid solution ("Pharm.-Jour." [3], vol. xii, p. 179). In consequence of a communication from Forst and Böhringer ("Berichte," xiv, 1270), I subsequently reported upon this investigation and indicated that the *hydrocinchonidine* of Forst and Böhringer was probably identical with my alkaloid and that it might exist in the cinchonidine described by those chemists as chemically pure ("Berichte," xiv, 1685).

The investigation in this direction of actually pure cinchonidine, afterwards undertaken by me, gave not the least trace of hydrocinchonidine, whilst commercial cinchonidine from different sources yielded it in varying quantities, and further showed that, in respect to its properties, hydrocinchonidine agreed perfectly with the alkaloid to which I had given the name "cinchamidine" ("Berichte," xiv, 1893").

The only remaining distinction between hydrocinchonidine and cinchamidine was therefore to be sought in the respective formulæ, $C_{19}H_{24}N_2O$ and $C_{20}H_{26}N_2O_2$. This difference may, however, be of no importance, as I have been informed on good authority that the hydrocinchonidine was not analyzed, but in assigning to it a formula they were guided by other considerations.

The fact that I was able to obtain the alkaloid in question very easily and in a different manner, without the use of potassium permanganate, as I shall show in a detailed communication that will appear shortly, induced me to test also, in this direction, cinchonine, conchicine¹ and quinine in different stages of their preparation.

With cinchonine, this investigation did not yield any satisfactory result, which I believe may be attributable to the fact that in the cinchona barks used by me in the manufacture of quinine, cinchonine, etc., *hydrocinchonine*, or the base resisting the action of potassium permanganate, occurs at most only in traces, so that certain evidence of the pre-existence of this substance (or substances) would be an impossibility. On the other hand, I was able to ascertain the occurrence of *hydrocinchonine* in a bark described as "china cuprea," but which was not suited to the manufacture in question. The composition of this base corresponds to the formula $C_{19}H_{24}N_2O$.

	Calculated.	Found.
C,	77.02 per cent.	76.93 per cent.
H,	8.11 " "	8.17 " "

The properties of this base do not correspond to those which Caventou and Willm, as well as Skraup, observed in *hydrocinchonine*; the crystals of my *hydrocinchonine* melted on the contrary at 256°C. (uncorr.) Further, the acid chloroplatinate of this base, differing from the corresponding platinum salt of the *hydrocinchonine* discovered by Caventou and Willm, forms a yellow amorphous powder, having the composition $C_{19}H_{24}N_2O, PtCl_6H_2 + 2H_2O$. Whether these differences are only accidental or dependent upon the substance itself must evidently be ascertained by further investigation.

The results obtained in subjecting the sulphates of conchicine and quinine to oxidation were less favorable than in the case of cinchonine.

At present my observations on cinchamidine have enabled me to separate from the mother-liquors of conchicine and quinine sulphates fractions which in the one case were rich in *hydroconchicine* and in the other in *hydroquinine*.

Hydroconchicine was found by me to have a composition corresponding to the formula $C_{20}H_{28}N_2O_2 + 2\frac{1}{2}H_2O$. It forms readily efflorescing prisms, which melt at 168°C. (uncorr.) and dissolve freely in hot alcohol and chloroform and less freely in ether. The solution of the

¹The alkaloid referred to by the author under this name is that commonly called quinidine.—Ed. P. J.

base in dilute sulphuric acid shows a blue fluorescence, whilst in a solution in hydrochloric acid this property could not be observed. These solutions, upon the addition of chlorine and an excess of ammonia, gave a dark green color.

The neutral sulphate crystallizes in delicate colorless crystals,¹ which have a great resemblance to the crystals of conchicine sulphate. When tested in the same way as conchicine with potassium iodide the same result is obtained. On the other hand its solution in dilute sulphuric acid differs from that of conchicine sulphate in its resistance to potassium permanganate.

With respect to *hydroquinine* the composition of the substance dried at 120° C. corresponds to the formula $C_{20}H_{28}N_2O_2$.

	Found.	Calculated.
C,	73.93	73.63
H,	7.96	7.97

Hydroquinine is precipitated by ammonia from the blue fluorescent solution in dilute sulphuric acid in white amorphous flocks, which immediately become crystalline. The water of crystallization in the air-dried base amounts to 7.75 per cent., though in well-formed crystals a higher amount might be found. The alkaloid melts at 168°C. (uncorr.), dissolves freely in alcohol and ether, and upon the evaporation of the solutions is left behind in an amorphous form. It exhibits with chlorine and excess of ammonia the same reaction as quinine, but resists the action of potassium permanganate for a longer time.

The acid platinum salt, $C_{20}H_{28}N_2O_2 \cdot PtCl_6H_2 + 2H_2O$, is thrown down as an amorphous yellow precipitate, afterwards becoming crystalline.

The neutral tartrate, $(C_{20}H_{28}N_2O_2)_2 \cdot C_4H_6O_6 + H_2O$, forms colorless prisms, which dissolve very sparingly in cold water, but to a greater extent than crystals of neutral tartrate of quinine.

The neutral sulphate, $(C_{20}H_{28}N_2O_2)_2 \cdot SO_4H_2 + H_2O$, crystallizes in colorless needles, sparingly soluble in cold water. In acid solution, under otherwise similar relations, it rotates the beam of polarized light less strongly than quinine sulphate. At $t=15^\circ$ and $p=4^\circ$ (anhydrous sulphate) it gave, in aqueous solution containing four mols. HCl, $(a)_D = -222.5^\circ$, which would give for hydroquinine under these conditions, $(a)_D = 255.9$.

¹The neutral sulphate of Forst and Böhringer's hydroquinidine (hydroconchicine) forms thick crystals with numerous planes, and is consequently not identical with my sulphate.

I cannot conclude this communication without first briefly referring to two other cinchona alkaloids.

The first is *homoquinine*, which was found simultaneously in cuprea bark by D. Howard and J. Hodgkin ("Phar. Jour." [3], xii, 528.), B. H. Paul and A. J. Cownley ("Ibid." [3], xii, 497), and G. Whiffen ("Ibid." [3], xii, 497) (see "Am. Jour. Phar.," 1882, p. 75). According to Herr J. A. Tod, who observed the alkaloid as far back as the autumn of 1880, this bark contains it very frequently, often to the extent of nearly 0.3 per cent.

For the material used in my investigation I am indebted to Herr Tod, who occasionally obtained it in his examinations of cuprea bark. The substance was purified by repeated recrystallizations from ether. When dried at 120°C. its composition corresponded to the formula $C_{19}H_{22}N_2O_2$.

	Calculated.	Found.
C,	73.54	73.67 73.16
H,	7.09	7.35 7.09

Homoquinine crystallizes from ether containing water, partly in flat prisms and partly in laminae. The former contain 2 molecules of water of crystallization, the latter apparently only 1 molecule.

	Calculated.	Found.
Prisms, $2H_2O$,	10.44	10.88 10.40 10.00
Scales, H_2O ,	5.49	6.54

Homoquinine melts at 177°C. (uncorr.); it dissolves freely in alcohol and chloroform, and sparingly in ether, from which it crystallizes in proportion as it can take up water. If dehydrating substances are present, it can apparently only be obtained amorphous. It dissolves in dilute sulphuric acid with blue fluorescence, and with chlorine and excess of ammonia is colored exactly the same as quinine.

Homoquinine gives with several acids easily crystallizable salts, the aqueous solutions of which yield with potassium iodide only a resinous precipitate. Its sulphuric acid solution immediately decolorizes potassium permanganate.

The neutral tartrate crystallizes in colorless needles, which are sparingly soluble in cold water.

The neutral sulphate, $(C_{19}H_{22}N_2O_2)_2SO_4H_2 + 6H_2O$, crystallizes in short prisms, which are very sparingly soluble in cold water and readily effloresce. (Found 12.50 and 13.37 per cent. H_2O ; calculated 13.07 per cent.) Since in respect to solubility in water this salt resembles almost exactly quinine sulphate, the possibility is not excluded that it

may also be present in the quinine sulphate of commerce. Nevertheless, for the detection of homoquinine sulphate in quinine sulphate, the process given in the German Pharmacopœia for the testing of quinine is quite useless. On the contrary Liebig's ether test has proved to answer, if a little more ether be taken.

The acid chloroplatinate is obtained as a yellow crystalline precipitate having the composition $C_{19}H_{22}N_2O_2 \cdot PtCl_6H_2 + H_2O$. (Found 26.11 per cent. Pt and 1.95 per cent. H_2O ; calculated, 26.42 per cent. Pt and 2.43 per cent. H_2O .)

The second alkaloid that I wish to mention is *cincholine*. If Rochelle salt and sulphocyanide of potassium be added successively to the mother-liquor first obtained in the preparation of quinine sulphate, until the latter no longer produces a precipitate, the light yellow solution supersaturated with caustic soda, and the alkaloid set free extracted by shaking the liquor out with ether; the ether leaves upon evaporation a brown mobile residue having a peculiar odor. Upon boiling with water the volatile bases present pass off from this residue, and can be suitably collected in dilute hydrochloric acid. This solution is then evaporated, the residue mixed with caustic soda solution and extracted with ether. After the ethereal solution has been repeatedly washed with water, solution of oxalic acid in ether is added to it drop by drop, and the cincholine oxalate is precipitated as a pasty mass, which quickly changes into shining laminae.

Cincholine, separated from the oxalate by means of caustic soda, is a pale yellow oil, having a strong basic reaction, lighter than water, and with a faint peculiar smell. It dissolves freely in ether, alcohol and chloroform, less so in water, and scarcely at all in soda solution. It can be distilled, especially in the vapor of water, is not colored by chloride of lime, and dissolves freely in hydrochloric acid, which it is capable of neutralizing. The neutral solution is tasteless, and upon evaporation the hydrochlorate separates in colorless, mostly four-sided scales. With gold and platinum chlorides it gives only resinous precipitates. Cincholine forms with oxalic acid a salt very sparingly soluble in water.

So far at present upon this base. In a future communication I propose to refer to the composition of this body, which may, perhaps play some part in the formation of quinine. For we find this body, so far as my experience goes, only in such barks as contain quinine.

The mixture of volatile alkaloids, obtained as above, when purified

through a single distillation, possesses an odor recalling somewhat that of chinoline. I have already previously called attention to a similar smelling constituent of cinchona bark ("Berichte," x., 2162). Possibly chinoline, which is known to stand in very near relation to cinchonine, also occurs in cinchona barks.—*Phar. Jour. and Trans.*, May 6, 1882; from *Berichte d. deutschen chemischen Gessellschaft*, xv., 854.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Alkaloids of Aspidosperma Quebracho.—Hesse has isolated six alkaloids from the bark of quebracho blanco (see "*Am. Jour. Phar.*," 1881, p. 169); but some specimens of the bark contain only three. The mixed alkaloids are obtained by boiling the bark with alcohol, distilling off the alcohol, adding excess of caustic soda and extracting with ether or chloroform; the solvent is evaporated, the residue treated with dilute sulphuric acid, the red-brown solution filtered and precipitated with soda.

Aspidospermine, $C_{22}H_{30}N_2O_2$, is obtained from the mixed alkaloids by dissolving them in warm dilute acetic acid, adding to the warm solution ammonia so long as a precipitate becoming immediately crystalline results, and filtering at once. Or the mixed alkaloids are dissolved in a little boiling alcohol, when on cooling aspidospermine and quebrachine crystallize together and are separated by treating the alcoholic solution with hydrochloric acid and evaporating to crystallization, when aspidospermine remains in the mother liquor, is precipitated by ammonia and purified from hot alcohol or ligroin (boiling between 70° and $120^\circ C.$) The alkaloid crystallizes in pointed prisms or delicate needles of dazzling whiteness, melts at 205° to $206^\circ C.$, a small portion subliming, is rather freely soluble in absolute alcohol, less freely in ether, ligroin and petroleum benzin, and freely in benzol and chloroform. It is levogyre, contains no water of crystallization, has no effect on litmus paper or on ferric chloride, and yields with platinic chloride a blue precipitate and with perchloric acid on heating a fuchsine red, but never a blueish solution. The solution in concentrated sulphuric acid is colorless, even in presence of a little molybdic acid, and yields with potassium bichromate a red-brown color, changing to dark-green.

Aspidospermine does not neutralize acids and is partially withdrawn

from its salts by ether, chloroform and other solvents. The neutral and acid sulphate and oxalate, the hydrochlorate and acid citrate are amorphous and have an acid reaction; a bibasic citrate does not exist, a portion of the alkaloid crystallizes and the amorphous mass, afterwards left, contains $1\frac{1}{2}$ mol. of alkaloid to 1 mol. of citric acid.

Aspidospermatine $C_{22}H_{28}N_2O_2$ is the principal alkaloid left in the alcoholic mother liquor of the total alkaloids. The acetic acid solution is reprecipitated by sodium bicarbonate, then treated with small quantities of ammonia as long as a flocculent precipitate (*of aspidosamine*) is formed, filtered, mixed with caustic soda and shaken with ether; the ether is evaporated and the residue boiled with a little ligroin (*hypoquebrachine* is left undissolved), when on cooling, besides amorphous substance, warty aggregations of, crystals of aspidospermatine are left, requiring purification from hot ligroin. The alkaloid is freely soluble in alcohol, ether and chloroform, melts at $162^{\circ}C.$, has a strong basic reaction and bitter taste, and is levogyre. It behaves like aspidospermine towards perchloric acid and sulphuric acid, but the latter solution is not colored by a little potassium bichromate. Its salts are amorphous, brown or yellow.

Aspidosamine, $C_{22}H_{28}N_2O_2$, is purified by precipitation with ammonia from acetic acid and by boiling with a little ligroin. It is at first colorless, but in the light becomes yellowish or reddish. It is amorphous, very freely soluble in ether, chloroform, alcohol and benzol, melts at about $100^{\circ}C.$, and has a bitter taste and strongly alkaline reaction. In aqueous solution of chloral hydrate it is colored red-brown by ferric chloride; it dissolves in sulphuric acid, with a blueish color (blue in presence of molybdic acid), the color being changed to dark-blue by a little potassium bichromate; the solution in perchloric acid is fuchsine-red. The hydrochlorate is brown, brittle and easily soluble in cold water.

Hypoquebrachine, $C_{21}H_{28}N_2O_2$, after being purified in acetic acid solution with animal charcoal, is yellowish and has an odor resembling chinoline which disappears on gentle heating, the alkaloid becoming brown. It melts near $80^{\circ}C.$, dissolves freely in alcohol, ether and chloroform, tastes bitter and forms yellow amorphous salts, which are freely soluble in water and give with ferric chloride a splendid cherry-red color. The solution in perchloric acid turns fuchsine-red upon boiling; that in sulphuric acid is at first colorless, but quickly becomes

of a violet color, and this is more intense in the presence of molybdic acid.

Quebrachine, $C_{21}H_{26}N_2O_3$, crystallizes as hydrochlorate from its solution with aspidospermine. The alkaloid forms delicate colorless needles, which slowly turn yellow in sunlight. It dissolves freely in boiling and little in cold alcohol, is slightly soluble in ether and ligroin and easily soluble in chloroform. It is dextrogyre, strongly basic and bitter, and is not colored by ferric chloride. The solution in perchloric acid becomes yellow upon heating; that in sulphuric acid becomes bluish in a few minutes and of a splendid blue color on the addition of lead peroxide, molybdic acid or potassium bichromate, the color with the chrominum salt passing after some time to red-brown.

The salts are crystallizable. The neutral sulphate, $(C_{21}H_{26}N_2O_3)_2SO_4 \cdot 8H_2O$, forms large cubes or short prisms, is freely soluble in boiling water, but with difficulty in alcohol. The neutral oxalate is in needles, anhydrous and extremely insoluble in alcohol and water. The neutral tartrate contains $6H_2O$, forms satiny tables and scales and is freely soluble in cold water, but slightly so in alcohol. The bibasic citrate and the hydrochlorate are sparingly soluble in cold water and alcohol, but more freely in hot water. The hydriodate is resinous, uncrystallizable and easily soluble in alcohol and water.

Quebrachamine was observed once in the alcoholic mother liquor, from the purification of aspidospermine and crystallized from the solution in hot alcohol, mixed with a little hot water. The colorless satiny scales melt at $142^\circ C$., dissolve freely in alcohol, benzol, chloroform and ether, have a basic reaction, and an intensely bitter taste. The alkaloid dissolves in caustic alkalies, is not colored by ferric chloride and dissolves in sulphuric acid with a blueish color, and dark violet in the presence of molybdic acid or potassium bichromate. The solution in perchloric acid, upon boiling, becomes yellowish, then yellowish-red and on cooling, turbid.

The six alkaloids in doses of 0.01 to 0.02 gm. produce in frogs paralysis of the motor apparatus, first of the respiratory muscles, as well as the other muscles of the system, whilst the sensibility remains intact for a long time. Four alkaloids (hypoquebrachine and quebrachamine were not tested) produce in frogs quickly an increasingly important slackening and finally a cessation of the heart-beats.

On exhausting the powdered bark with ether, chloroform or petroleum benzin, evaporating the solvent and treating the smeary residue

with boiling alcohol, upon cooling, crystals of an alcohol-like substance are obtained which has been named *quebrachol*; it is lævogyre, melts at 125°C . and has the formula $\text{C}_{20}\text{H}_{34}\text{O}$.—*Phar. Jour. and Trans.*, March 25, 1882, p. 781–785; from *Ann. d. Chemie*, ccxi.

Loxopterygium Lorentzii, Grisebach, nat. ord. Terebinthaceæ. The bark of *quebracho colorado* contains a considerable amount of tannin, and is used in its native country for tanning purposes. The wood, as its name implies, is of a red color and is used in the preparation of an extract. O. Hesse found in the wood minute quantities of two alkaloids which may be obtained together by the process for preparing the alkaloids from white *quebracho*. One of the alkaloids is precipitated from the acetic acid solution by potassium sulphocyanide, and, after decomposition by soda and agitation with ether, acquires with dilute sulphuric acid a magnificent blue color, which is evidently due to a body produced by oxidation.

The second alkaloid, *loxopterygine*, may be precipitated by ammonia, is in white amorphous flocks, freely soluble in ether, alcohol, chloroform, benzol and acetone, has a strong basic reaction, tastes intensely bitter, is not colored by ferric chloride and dissolves in nitric acid with a blood-red color. The solution in sulphuric acid is yellowish, and in the presence of molybdic acid or potassium bichromate blue or violet. The solution in perchloric acid, upon warming, becomes brown-red. The alkaloid melts at 81°C ., and quickly decomposes at a higher temperature. Its composition is probably $\text{C}_{26}\text{H}_{34}\text{N}_2\text{O}_2$. From 6 kilograms of the wood only about 0.5 gm. of the alkaloid could be obtained.

Dr. Hesse calls attention to the chemical relation of the alkaloids contained in *quebracho blanco*, and that nearly related thereto are the alkaloids *paytine* and *paytamine* which more than ten years previously were obtained by him from a bark then unknown, but since recognized as from a species of *Aspidosperma*. The close relationship of this genus to *Strychnos* explains why the *Aspidosperma* bases present in their reactions a certain similarity to the *Strychnos* bases, likewise in their physiological action, although the former are less powerful in their action than the latter, especially curarine. A certain degree of caution in the use of these bases is undoubtedly required. For the mixed alkaloids the designation *quebrachetum* is proposed, in analogy to "quinetum," used for the mixed cinchona alkaloids.—*Phar. Jour. and Trans.*, April 1, p. 807–809; from *Ann. d. Chem.*, ccxi.

Rhubarb cultivated at St. Petersburg has been assayed by F. Beil-

stein. The roots were six years old from both *Rheum officinale* and *Rh. palmatum*. The dried, peeled and powdered root was exhausted with benzol, this solution distilled and the resulting extract boiled with soda solution; the solution, after cooling and filtering, retained only emodin, which could be precipitated by hydrochloric acid, while the undissolved chrysophanic acid was purified by repeated crystallization from alcohol and from 70 per cent. acetic acid. The highest yield was obtained from *Rh. palmatum* grown in a sandy moorland, and gave one per cent. of the crude mixture, one-fourth of which was emodin, and the remainder chrysophanic acid. The root of the same species grown in clayey soil yielded only half per cent. of chrysophanic acid, with very little emodin. A like yield was had from *Rh. officinale*, but the product contained only uncertain traces of emodin.

The rhubarb used in Russia is now imported from England; the author, however, thinks it may be advantageously cultivated also for exportation.—*Phar. Zeitschr. f. Russl.*, 1882, No. 16.

Storax and sulphuric acid yield under certain circumstances white needles nearly insoluble in ether (see "*Amer. Jour. Phar.*," 1881, p. 251), for which Mylius proposes the provisional name *styrogenin*. Several other crystalline compounds, which are, however, more freely soluble in ether, are produced at the same time. The composition of *styrogenin* appears to be $C_{26}H_{40}O_3$. It is sparingly soluble in alcohol, benzol and benzin, somewhat more soluble in hot toluol and amylic alcohol, very freely soluble in chloroform, in which solution on the addition of bromine, substitution compounds are produced. It dissolves in cold sulphuric acid without alteration; but on warming an orange-red liquid is formed from which water precipitates an uncrystallizable resin, soluble in ether. *Styrogenin* may be obtained from that portion of *storax* which is dissolved by boiling petroleum benzin; but it is not produced from *styracin* or *storesin*.—*Phar. Centralh.*, 1882, p. 79 to 81.

Aconitic acid was found by A. Bähr (1877) in the juice of the sugar cane and in crude sugar. H. B. Parsons has established its presence also in the juice of the sorghum; the scale from sorghum sugar pans was found to be impure calcium aconitate, $CaHC_6H_3O_6 \cdot H_2O$.—*Amer. Chem. Jour.*, iv, No. 1.

Free acid in fresh cows' milk was observed by Dr. C. Arnold. The milk had a peculiar unpleasant, somewhat acrid taste, was free from uncombined volatile fatty acids, but contained 80 per cent. of a peculiar fat acid, the nature of which was not determined, nor was the

cause for the presence of the free acid ascertained.—*Arch. d. Phar.*, 1882, April, 291 to 293.

Copper in Grain and Flour.—J. Van den Berghe found in the ash obtained from a million parts of grain and of flour from 8 to 11.1 parts of copper, and the same amount also in bread.—*Chem. Zeitung*, 1882, March 16, p. 223, from *Mondes*, lvi, 209.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Aluminium palmitate is a resin-like compound which melts at a higher temperature than dammar and copal, and is readily soluble in oil of turpentine and benzol, a solution in 5 parts of the solvent being still thick and varnish-like. K. Lieber states that it makes an excellent varnish, which dries readily, remains permanently pliable and has a handsome silky lustre, which is increased by the addition of copal and dammar. It is insoluble in water, does not penetrate through paper and seems to be well adapted for extensive use in the arts.—*Zeits. Oest. Ap. Ver.*, 1882, p. 38; *Dingl. Polyt. Jour.*, vol. 240, p. 243.

Liquor Aluminium acetatis.—Prof. Poleck reports the following process which has been adopted for the German Pharmacopœia: 300 parts of aluminium sulphate are dissolved in 800 parts of water and mixed with 360 parts of acetic acid. To this solution is gradually added precipitated calcium carbonate 130 parts, previously triturated with 200 parts of water. The mixture is set aside for a day and occasionally stirred, then strained, the precipitate pressed and the liquor filtered. The filtrate weighs 1277 parts, has the density 1.0455 to 1.0457, and contains 7.69 to 7.76 per cent. aluminium acetate, $\text{Al}_2(\text{C}_2\text{H}_3\text{O}_2)_4(\text{OH})_2$, .23 to .47 per cent. Al_2O_3 and .33 per cent. CaSO_4 . It is clear, colorless, has a faint acetic odor, and after the addition of 2 per cent. potassium sulphate, when heated in a water-bath, gelatinizes, but after cooling slowly becomes limpid and clear again.

Dr. Vulpius recommends the use of very capacious and shallow vessels in making this preparation. The precipitated calcium sulphate is very voluminous, but parts with the enclosed solution readily by a gradually increased pressure.—*Archiv d. Phar.*, April, 1882, p. 257-269.

Saccharated soluble Ferric Oxide.—Dr. Brunnengraeber has fur-

nished the following formula for the new German Pharmacopœia: Dissolve powdered sugar 9 parts in water 9 parts; add solution of ferric chloride (sp. gr. 1.280 to 1.282, containing 10 per cent. iron) 30 parts; afterwards gradually and with continued stirring, a solution, prepared with heat and allowed to cool, of sodium carbonate 24 parts in water 48 parts. When the evolution of carbonic acid gas has ceased, add gradually caustic soda solution (sp. gr. 1.159 to 1.163, containing 15 per cent. of NaOH) 24 parts. When clear, add to the liquid sodium bicarbonate 9 parts and dilute at once with boiling water 600 parts, set aside, remove the clear liquid with a syphon, mix the precipitate twice with boiling water 400 parts; after subsidence syphon off the liquid; finally collect the precipitate upon a moist strainer, wash it with hot water until the filtrate is not precipitated, but merely rendered opalescent with silver nitrate, and express. Mix the precipitate in a porcelain dish with powdered sugar 50 parts, evaporate in a steam-bath to dryness, stirring constantly, and triturate the residue with sufficient sugar to make the weight equal to 100 parts.

It in a red-brown powder of a sweet ferruginous taste, contains 3 per cent. of iron and yields with 20 parts of hot water a clear red-brown solution which is not altered by potassium ferrocyanide, but on the further addition of hydrochloric acid yields at first a dingy green, afterwards a blue precipitate. If 2 grams of the powder are ignited, the residue treated with boiling hydrochloric acid, the filtrate oxidized with potassium chlorate and heating, and the cold liquid mixed with 1 gram of potassium iodide, and digested for an hour in a stoppered bottle, the mixture, in the presence of a little solution of iodide of starch, must require from 10 to 10.7 cc. of tenth normal solution of sodium thiosulphate to combine with the separated iodine.—*Arch. d. Phar.*, April, 1882, p. 289-291.

Albuminated ferrous borotartrate is recommended by Carlo Pavese as an antiseptic and antifermentative and as possessing sedative properties. It is prepared by mixing in a porcelain dish finely powdered boric acid 1 part and tartaric acid 1 part with iron filings 2 parts and sufficient water to form a liquid. The mixture is gradually heated to 212°F., and then allowed to cool. Fresh egg albumen 6 parts is now added and the whole well mixed until it is reduced to a homogeneous mass, which it set aside for a week at a temperature not exceeding 76°F., and occasionally stirred; it is then filtered and the filtrate evaporated below 95°F. to dryness, and powdered.

It is a light straw-colored powder of a not disagreeable taste, inodorous, soluble in water, and the solution is not precipitated by alkalies, but yields black precipitates with tannin and potassium sulphide, and a blue precipitate with potassium cyanide; strong acids separate the boric acid and albumen.—*Phar. Jour. and Trans.* April 22, p. 864; *Annali di Chimica*.

Mercurial Peptones.—The following normal solution of mercuric peptone is prepared by E. Delpech: Dissolve peptone in powder 9 grams, ammonium chloride 9 grams and corrosive sublimate 6 grams in distilled water 24 grams, filter and add glycerin 72 grams. The solution contains 5 per cent. of corrosive sublimate combined with peptone; since it is liable to precipitate after some time it should be prepared only in small quantities at a time. The precipitate, however, is free from mercury. The dry compound contains 25 per cent. of corrosive sublimate and may be employed hypodermically by dissolving it in water containing a little glycerin.

For internal use a solution of dry mercuric peptone 1 gram in distilled water 200 grams and glycerin 50 grams may be used in place of Van Swieten's liquid, and is given in doses of a teaspoonful, equal to .005 gram of corrosive sublimate, diluted with a little water or milk.—*Jour. Phar. Chim.*, Feb., 1882, p. 151, 152.

Mercuric Iodide and Sodium Hyposulphite.—J. M. Eder and G. Ulm found that 1 molecule of mercuric iodide requires 2 molecules sodium hyposulphite for solution. On standing, warming, or evaporation in vacuo the liquid gradually deposits a precipitate varying in color between yellowish and vermilion-red and containing mercurous iodide, sulphide of mercury and sulphur, the latter being partly insoluble in carbon bisulphide. The precipitate turns black in the light. The solution probably contains a double salt $\text{HgI}_2(\text{Na}_2\text{S}_2\text{O}_3)_2$.—*Wien. Anz.*, 1882, p. 37.

For disguising the odor of Iodoform Dr. Puetz employs oil of mirbane (nitrobenzol), 6 drops of which are sufficient for 1 gram of iodoform.—*Phar. Zeitung*, April 1.

Aqueous solution of Iodoform is prepared by Dr. Schadevald as follows: A large glass flask is filled to about one-third with distilled water and for each liter capacity 2 grams of iodoform are added; the flask is closed with a plug of cotton and heated for about 30 minutes to between 80 and 90°C. Violet-colored iodoform vapors are produced; that these vapors are not iodine may be proven by condensa-

tion upon a cold glass rod. The liquid is slowly cooled and filtered, yielding a bright golden-yellow filtrate which contains between .5 and .7 per cent. of iodoform.—*Phar. Zeitung*, April 15, 1882.

Solubility of Iodoform.—Dr. Vulpus, in several communications, published in "*Archiv der Pharmacie*," gives the following information: Hot glycerin dissolves 1 per cent. of iodoform, more than one-half of which separates on cooling. Hot olive oil takes up about 20 per cent. of iodoform, of which 2 per cent. remains in solution after cooling. The solution in chloroform rapidly becomes dark red, probably in consequence of a mutual reaction between the two compounds. With collodion a 10 per cent. solution of iodoform can be readily prepared by agitating the latter with a little ether and afterwards with the collodion, and even a 15 per cent. solution may be made. At the ordinary temperature, 100 parts of the following liquids dissolve of iodoform the amounts indicated:

Petroleumbenzin 1 part, benzol 1.5 part, absolute alcohol 4 parts, oil of turpentine 4 parts, oil of lavender 7 parts, oil of cloves 8 parts, oil of fennel 9 parts, oil of lemon 9 parts, oil of rosemary 9 parts, oil of cinnamon 14 parts, oil of caraway 16 parts, ether 16 parts.—*Archiv der Phar.*, Jan, 1882.

Iodoform Pencils for fistulas are prepared by triturating together finely powdered iodoform and butter of cacao, of each 2 grams, and rolling the mass out into five pencils of 2 millimeters thickness, which are dusted with lycopodium.—*Phar. Centralhalle*, 1882, p. 193.

Woelfer's Iodoform Gauze.—Dissolve 60 grams of rosin in 1,200 grams strong alcohol and add 50 grams of glycerin; soak in this liquid 6 meters of gauze deprived of fat, express, and when about half dry dust upon it 50 grams finely-powdered iodoform.—*Ibid.*

Iodoform Toothpaste for application to exposed nerves is recommended by Schaff on account of its anæsthetic and mild caustic properties, without producing irritation or inflammation.

It is prepared by triturating powdered iodoform and kaolin, of each 4.0 grams, carbolic acid 0.5 grams, oil of peppermint 10 drops with sufficient glycerin.—*Ibid.* p. 147.

Preparation of Atropine.—1,000 grams powdered belladonna leaves are exhausted by displacement with 84 per cent. alcohol; the tincture is distilled and the extract treated with five times its volume of water; the aqueous solution is filtered from the resin and fat, evaporated to 300 cubic centimeters, mixed with an excess of ammonia, and the

excess allowed to evaporate by exposure. The liquid is now agitated with ether which is absolutely free from alcohol, and the ethereal solution well shaken with a small quantity of water containing a little acetic acid; the acetic solution is treated with animal charcoal, concentrated by evaporation and again treated with ammonia and ether on the spontaneous evaporation of the ethereal solution the atropine is left in nearly white very fine crystals, which are obtained white by recrystallizing once or twice.—*Chem. Centralbl.*, 1882, p. 180.

The reddening of Carbohc Acid is not always caused by light, but may take place in the dark, and rosolic acid is not always found in the reddened acid. Ammonium nitrite produces with carbohc acid a red color which gradually changes to yellow, brownish green, olive-green, finally to a dingy bluish gray.—*Phar. Zeitung*, April 12, 1882.

The detection of mineral acids in Vinegar is readily effected, according to Chiappe, by a 0.1 per cent. solution of methylaniline-violet, the color of which is not altered by organic acids, while even largely diluted mineral acids change the color to ultramarine-blue.—*Chem. Zeitung*, March 23, 1882, p. 244; *Giorn. Farm. Chim.*, xxxi, p. 76.

Artificially-colored Claret is not unfrequently met with. According to C. Thomas, Bordeaux red, a new coal-tar product, has been used for coloring, and its presence may be detected by immersing for six or eight minutes raw unsized silk in the warmed wine, the natural coloring matter of which will dye the silk of a violet-pink color, changing to green by ammonia, or, if old wines are tested, to greenish, while Bordeaux red will impart an intense red color, changing to brown by ammonia. Burnt alum assumes with the natural claret a grayish violet, but in the presence of Bordeaux red a red color.—*Rép. de Phar.*, 1882, p. 64.

Another method depends upon the recognition as sulphate of the sulphur contained in the Bordeaux red: 100 cc. of claret is mixed with an excess of baryta, the filtrate freed from barium by ammonium carbonate, evaporated and ignited; the ash is treated with dilute hydrochloric acid and the filtrate tested with barium chloride. 0.5 gram Bordeaux red in 1 liter of claret produced a distinct precipitate.—*Rép. de Phar.*, 1882, p. 64, 111.

SOME REMARKS UPON MODERN PHARMACEUTICAL STUDY.

BY H. J. MÖLLER.

(Continued from page 323.)

HOLLAND.

This country holds a very peculiar position with regard to pharmaceutical study, and also with regard to several other pharmaceutical conditions. During a journey through Holland, in the spring of this year, I had the opportunity to get a superficial view of Dutch pharmacy and to collect the laws and other information of which I had need. I owe many thanks to Professor Van der Burg, in Leyden, for the kindness with which he has answered my letters and procured me every further explanation I desired.

"Wet van den 25^{ten} December, 1878, houdende regeling der voorwaarden tot verkrijging der bevoegdheid van arts, tandmeester, apotheker, vroedvrouw en apothekersbediende,"¹ is the Dutch title of the Pharmacy Act by which the rules for pharmaceutical study have been lately fixed in a quite peculiar way. I shall here translate only the most important parts of this law which by a "Besluit van den 12^{den} Februarij, 1879," was enforced August 1, 1879.

Art. 1. The title of physician is acquired by the *practical medical examination*, which is fixed in article 2.

Art. 3. This practical examination can only be passed by those students who have already passed the *two examinations in the natural sciences* and the *theoretical medical examination*.

Art. 4. *The first examination in natural science* embraces natural history, chemistry and botany. In order to pass this examination it is required that the candidate (1) shall have passed the pass examination between the fourth and fifth classes in a "gymnasium," with a course of six years; or (2) shall have been in the highest class of the "pro-gymnasium;" or (3) shall have passed the final examination in a higher "burgerschool," with a course of five years. (This examination is also necessary for a pharmacist.)

Art. 5. *The second examination in natural science* contains anatomy, physiology, histology, pathology, therapeutics and materia medica; it is only passed by physicians, and the same is the case with the theoretical medical examination, which is fixed in article 6.

Art. 11. The title of "Apotheker" gives the right to practise pharmacy, and is obtained through the *practical pharmaceutical examination*, which demands proof of sufficient knowledge in analysis and pharmacy. Before the candidate can be admitted to this examination he must have been an apprentice in a pharmacy at least two years.

Art. 12 demands that before the *practical pharmaceutical examination* the *theoretical* shall be passed.

In accordance with article 13 this last mentioned examination embraces pharmacy, toxicology, and analytical chemistry.

¹ "Law of December 25, 1878, containing the order of the conditions for admission as a physician, dentist, pharmacist, midwife and 'apothecary-servant.'" This law is published in "Staatsblad van het Koninkrijk der Nederlanden," No. 222, 1878.

Art. 15. The right to be admitted to the *theoretical* pharmaceutical examination belongs to those candidates only who have passed the first examination in natural science (see article 4).

Art. 17. Those only can be "Apothecary-servants" (in Dutch, "Apothekers-bedienden"), with the same rights as the earlier "Hulpapotheker" (*i. e.*, assistants), who are at least eighteen years old, and have passed an examination which has shown that they possess sufficient knowledge, and are practised in preparing medicine after prescriptions.

Art. 18 determines that the practical examinations (see articles 2, 8 and 11) shall be passed before a special board of examiners.

Art. 20 determines that the examination of the "apothecary-servants" shall be passed before another special board of examiners.

The import of these somewhat complicated rules is, in a few words, the following: The young man who in Holland desires to study pharmacy or medicine can choose whether he will receive his preliminary education in the classical school or in a higher "burgerschool." Then he must receive a practical education of at least two years with a pharmacist (or a physician, if he is studying medicine), and passes now "the first examination in the natural sciences" (common for both, see article 4). The medical student passes then a *second* examination in the medical branches of natural science especially (see article 5). Now they both pass the *theoretical* examination of their respective professions (see articles 6 and 13), and finally their respective *practical* examinations (see articles 2 and 11).

By this the complete equality of pharmacy and medicine is shown. To make the analogy complete, some so-called "apothecary-servants" are placed under the pharmacist, in the same way as the "chirurgeons" and sick-watchers assist the physician in the less important point of attendance upon patients. These "apothecary-servants" can of course never manage or possess a pharmacy. Another peculiarity in the Dutch pharmacy is the frequent education of *female* apprentices, which arrangement is found very satisfactory in Holland; January 1st, 1879, Holland had altogether 259 pharmaceutical apprentices (called in Dutch "Leerling"), and of these 48 were female.

According to the explanations which Professor Van der Burg has been so kind as to give me, the examination of the Dutch pharmacist includes forensal and quantitative analysis, as well as microscopical study of the pharmaceutical drugs and their adulterations. The *theoretical* part of the examinations is held at the universities (in Leyden, Utrecht, Groningen and Amsterdam); the *practical* part is passed before a special Government Commission, which is changed every year. Having passed his examinations the pharmacist can establish himself when and where he will.

The "apothecary-servants" do not frequent the universities, and there is no government institute which is established particularly for their education. In Amsterdam there is a special school, connected with the industrial school of the city, where "apothecary-servants" can obtain education if they wish it, and a society for the development of pharmacy ("Rotterdamsche Departement van de Maatschappij te bevordering der Pharmacie") is at present (June, 1880) occupied with the establishment of a similar school in Rotterdam.

(To be continued.)

VARIETIES.

MOUTH WASHES.—Dr. W. Herbert Rollins, in the Boston "Med. and Surg. Journal," gives the following as examples of mouth washes. The use of carbolic acid alone, or in combination with an alkali, can seldom be resorted to, because patients associate it with unpleasant places. Benzoic acid, thymol, eucalyptus oil, or boracic acid, answer the purpose, and some one of them is generally agreeable to the patient.

- | | | |
|------|--------------------------------|-----------------|
| 1. R | Sodæ boratis, | 15 grams. |
| | Thymol, | 200 milligrams. |
| | Aquæ, | 1,000 grams.—M. |
| 2. R | Sodæ boratis, | 15 grams. |
| | Olei eucalypti, | 2 grams. |
| | Magnesiæ carbonatis, | 4 grams. |
| | Aquæ, | 1,000 grams.—M. |

Rub the oil with the magnesia, add the water gradually, having dissolved the borax in it, then filter and mark the filtrate mouth wash.

The patient should hold the wash in the mouth for at least a minute, forcing it constantly in and out through the spaces between the teeth, to bring the fluid in contact with the points of decay, changing their reaction from acid to alkaline, and washing out the debris collected about the necks of the teeth and in the spaces between them.

DISTRIBUTION OF ALCOHOL IN NATURE.—According to A. Müntz, alcohol is formed in the soil and in waters by the decomposition of organic substances, and its vapor ascends into the atmosphere, whereupon, through meteoric influences (rain, etc.), it again finds its way to the earth. Its presence therein may be readily proved by means of the iodoform test, particularly when such fluids are previously subjected to distillation and the portion tested which first distills over.—*Compt. Rend.*, xell, p. 499.

MINUTES OF THE COLLEGE.

A stated meeting of the Philadelphia College of Pharmacy was held at the Hall on Monday, June 26, 1882.

The President being absent, Charles Bullock, Vice President, occupied the chair.

Eleven members were in attendance.

The minutes of the annual meeting were read and, on motion, adopted.

The minutes of the Board of Trustees since March last were read by William C. Bakes, Secretary of the Board, and, on motion, approved.

These minutes inform the College of the election of the following gentlemen as members, viz.: Messrs. George M. Beringer, Benjamin S. Gilbert,

Andrew G. Frey, Clarence T. Smith, Mahlon Kratz, and Charles C. Drue-
ding.

The three delinquent members reported at the last meeting of the Col-
lege being still in arrears, their names were, on motion, ordered to be
stricken from the roll.

The resignation of Andrew Blair, as a member of the Board of Trustees,
was read and accepted, and, on motion of Wm. B. Webb, the vacancy in
the Board was directed to be filled at the semi-annual meeting of the Col-
lege in September next.

The following gentlemen were elected delegates to represent this College
at the annual meeting of the American Pharmaceutical Association, which
will be held at Niagara Falls, on Tuesday, the 12th of September next,
with power to fill all vacancies which may occur, viz.: Messrs. Alonzo
Robbins, William McIntyre, Edward C. Jones, Robert England, and Dr.
A. W. Miller.

As delegates to the Conference of the Schools of Pharmacy, which meets
at the same time and place, the following gentlemen were elected, with
power to fill all vacancies which may occur, viz.: Messrs. Charles Bullock,
Prof. John M. Maisch, Prof. Joseph P. Remington.

Then, on motion, adjourned.

WILLIAM J. JENKS, *Secretary*.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

AMERICAN PHARMACEUTICAL ASSOCIATION.—The members of this As-
sociation are hereby notified that the Thirtieth Annual Meeting of this
Association will be convened on Tuesday, September 12th, 1882, at 3 o'clock,
at Niagara Falls, New York.

The time, the place, and the unusual attractions which will be afforded
the visiting members will, beyond any doubt, make this one of the largest
gatherings the Association has ever had.

The Local Secretary, Mr. Hiram E. Griffith, and the special committee
on entertainment have perfected arrangements which will tend to the com-
fort and pleasure of visiting members, and which cannot fail to be an addi-
tional inducement to increase the attendance beyond previous years. These
arrangements will be duly announced in a special circular to members,
early in August.

The objects of the Association commend itself to the favorable consider-
ation of every respectable pharmacist of our land, and it should have their
hearty co-operation.

Its membership, now over 1,300, enrolls a large number of our best phar-
macists, and it seeks the addition of good pharmacists to its membership,
that they may enjoy its privileges and benefits.

Blank forms of application for membership will be forwarded to all per-
sons who desire them, and who will write to either the President, the Sec-
retary, Prof. J. M. Maisch, Philadelphia, or G. W. Kennedy, Pottsville, Pa.

P. W. BEDFORD, *President*.

New York, June 20, 1882.

THE NEW YORK COLLEGE OF PHARMACY has begun to fit up the building recently purchased, adjoining the College, and will have a very complete Pharmaceutical Laboratory on the lower floor. It will be ready for students October 1st.

NEW YORK STATE PHARMACEUTICAL ASSOCIATION.—The fourth annual meeting was held in Albany, June 20th and 21st, with an attendance of about one hundred and fifty members. Dr. A. B. Huested, of Albany, read a valuable address of business, and historical interest. During the sessions one hundred and thirteen new members were elected. The reports of the several committees were of satisfactory character, and appropriate action was taken on them.

Amendments to the constitution were offered, providing that the annual meetings shall be held at such time and place as the Association shall previously elect, and also that all routine and general business not of a scientific nature, and not otherwise provided for, shall be transacted by the Executive Committee, as also all business during the intervals between the annual meetings, they to report at each sitting of the Association, and their acts to be subject to the revision of the Association. The report of the Committee on Pharmacy Law explained the failure to secure the enactment of the law, and the Association voted that a Committee on Legislation be appointed, and that they present the law again at the next session of the Legislature. The Secretary was voted an annual salary of one hundred dollars, and the Treasurer was made a life member without payment of fees. On motion the following persons were elected honorary members: Prof. J. M. Malsch, Prof. Oscar Oldberg and Edward R. Squibb, M.D.

The papers read were: "Self-education for the young pharmacist—how can it best be accomplished, and what course of instruction is best adapted for this purpose," by Prof. P. W. Bedford. "On Fluid Extract of Wild Cherry," by Clay W. Holmes. On "Pill coating with gelatin," by Clay W. Holmes, and one entitled "The Pharmacist and his relation to Society," by Charles H. Scoville. They were all referred for publication.

The next annual meeting will be held at Ithaca, on the third Thursday of June, 1883. Mr. John B. Todd was elected local secretary. The officers of the association for the ensuing year are: President, A. B. Huested, Albany; Vice Presidents—W. H. Rogers, Middletown; C. Z. Otis, Binghamton; T. J. MacMahan, New York; Secretary, Clay W. Holmes, Elmira; Treasurer, C. H. Butler, Oswego; Executive Committee—F. L. Norton, Delhi; W. L. Dubois, Catskill; W. P. DeForrest, Brooklyn.

Delegates were elected to the American Pharmaceutical Association, and other delegations were appointed to attend the meetings of similar organizations in neighboring States.

The exhibition of objects of pharmaceutical interest was held in the hall above the one in which the sessions of the meeting were held.

The social features of the meeting were very attractive. Members visited the Capitol and Penitentiary, drives through the Park, and excursion down the river with music and collation were all duly enjoyed.

THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION held its fifth

annual meeting in the Opera House at Altoona, June 13th and 14th, the rear part of the hall being used for the display of exhibits.

President Kelly called the meeting to order a short time before 11 o'clock. Delegations from the Trade Association of Philadelphia Druggists, and from the Lancaster County and Reading Druggists' Associations, were received, and addresses of welcome were delivered by Hon. M. Howard, Mayor, and by Dr. Findlay, of Altoona. The medical profession of the city was invited to the courtesies of the floor. In his annual address, the President made various suggestions, which were referred to a committee of three for consideration and report; a like course was taken with the suggestions made by the Executive Committee. Dr. J. A. Miller read the Secretary's report, and Mr. J. L. Lemberger that of the Treasurer, showing a balance on hand amounting to \$761.18.

The following officers were elected for the ensuing year: President, Alonzo Robbins, of Philadelphia; Vice-Presidents—J. B. Duble, of Williamsport, and Chas. H. Cressler, of Chambersburg; the Treasurer, Secretary and Executive Committee were re-elected.

At the second session delegations from the State associations of Ohio and West Virginia were received and welcomed, and committees were appointed on the next annual meeting and on the exhibition.

Mr. W. L. Turner read the report of the Committee on Trade Interests and Legislation, which was accompanied by the draft of a pharmacy law for the State, and this was ordered to be printed and to be considered at the morning session on the following day.

Dr. L. Wolff presented the report on adulterations and deteriorations, and from Mr. C. T. George was received the report on papers and queries.

The report on apprentices, read by Mr. W. B. Thompson, took strong ground in favor of a more thorough and systematic training of apprentices in all practical details of the business by their employers, and was warmly discussed by many members.

A report on county societies was made by Dr. Wolff, and the organization of other local associations urged.

At the evening session reports from the delegates to the National and various State pharmaceutical associations were received; also from a committee who had visited Washington in the interest of the repeal of the stamp tax, and a resolution was adopted urging upon Congress the abolition of the tax on matches, perfumery, bank checks, etc., and the reduction of the revenue tax on alcohol.

Two papers were read on the *preservation of essential oils*, one by Ch. A. Heinitch, the other by J. W. Ridpath. Various methods were alluded to, and precautions were mentioned by means of which such oils may be kept in rather small bottles, excluded from the light and in a dark place.

Phosphorus pills was the title of a paper by A. Robbins. They are recommended to be made by rubbing 30 gr. of Tolu balsam with 70 gr. of wheat flour until reduced to a fine powder; a solution of 1 gr. of phosphorus in 1 fluidrachm of warm chloroform is then added, and the whole triturated until a pilular mass is obtained, which is rolled out and divided into the requisite number of pills. The pills may be moistened with a strong solution of tolu in ether, and rolled in liquorice root or other pow-

der; or, preferably, they should be gelatin coated. For this purpose R. H. Dimock's mixture ("Am. Jour. Phar.," 1879, p. 435), somewhat modified, may be used: Coxe's gelatin ʒi , acetic acid ʒxxx , spirit of nitrous ether ʒxii , and oil of gaultheria m̄x . A mixture which dries more rapidly, and is to be used while hot, is made of gelatin ʒi , sugar ʒss , and water ʒii .

A paper by G. W. Kennedy gave the results of the analysis of ten samples of *cream of tartar* as sold by grocers. Only one sample was found to be unadulterated, but it contained about 14 per cent. of calcium tartrate. The remaining samples contained from 24 to 90 per cent. of adulterations, consisting of starch, chalk, gypsum, alum and terra alba, the latter being present in one sample to the extent of 60 per cent.

Dr. L. Wolff read a paper on *pumpkin seed*. He found the oil of the seed, extracted by petroleum benzin, to be destitute of tenifuge properties, to have a neutral reaction, to be insoluble in alcohol, and to consist of glycerides of oleic, palmitic and myristic acids; but the oil extracted by ether or chloroform acted as a tenifuge. The active principle is a resin, as has been previously pointed out by Haeckel, and may be obtained by exhausting the seeds, previously deprived of oil by petroleum benzin, with alcohol, ether or chloroform; it is greenish-brown, soft, has an acrid and bitter taste, and may be given as a tenifuge in doses of 15 grains in pill form. One or two fluidounces of the alcoholic fluid extract, given in the morning in broken doses and largely diluted, proved likewise efficient. The medicine should be followed in a few hours by a dose of castor oil, or by an emulsion prepared from one ounce of the seed. The electuary made by beating the decorticated seed into a pulp with sugar was found to be unreliable.

Resin of podophyllum was the subject of a paper by C. C. Klump, who found the resin prepared by the process of the pharmacopœia to be soluble in ether (specific gravity not given), with the exception of less than one per cent., which was partly soluble in alcohol. If prepared with the aid of alum, ether left an insoluble residue of over 20 per cent., and a nearly like amount was left by another sample; the insoluble portion did not act as a purgative in doses of two grains. The pharmacopœia process is regarded to be unexceptionable.

The valuable papers on *Pharmaceutical education*, by W. B. Thompson, and on *Beaumé's hydrometer*, by Gust. Pile, explaining the manner of constructing the instrument and the relation of the degrees to specific gravity, are not adapted for epitomizing.

A paper by Professor Maisch, on *The useful American myrtles*, is published on page 345.

A paper on *Percolation*, by W. M. Thomson, described the apparatus and process noticed by R. F. Fairthorne, on page 236 of our May number.

The fourth session, held on Wednesday morning, was mainly devoted to the consideration of the pharmacy bill, which was amended and referred back to the committee, with the instruction to endeavor to secure its passage at the next session of the legislature, and with power to further amend it if deemed necessary.

At the fifth session, held Wednesday evening, several of the above papers were read, and various amendments to the by-laws adopted. The salaries of the secretary and treasurer were increased to \$100. The Executive Com-

mittee was empowered to invest any surplus funds in the hands of the treasurer. Applicants for membership are required to accompany their application with the admission fee and dues for one year.

A resolution offered by Mr. G. A. Kelly, favoring a duty of 10 per cent. on imported quinine, was passed.

Various committees and delegations to the American and several State Pharmaceutical Associations were appointed.

Resolutions of thanks were adopted, and at a late hour the Association adjourned to meet at Harrisburg on the third Tuesday of June, 1883, Mr. C. H. Boker having been elected Assistant Secretary. Over 100 new members were elected during the meeting.

Most of the members present and the ladies had an opportunity of visiting the extensive workshops of the Pennsylvania Railroad Company, and to enjoy the attractive scenery around the Mountain City. On Wednesday afternoon an excursion was taken by the narrow gauge railroad through the picturesque Bell's Gap to Valhalla, and on Thursday morning many of the visitors went by rail over the famous horseshoe to Cresson, inspecting the recently enlarged "Mountain House," and visiting the magnesia, iron and alum springs in the vicinity.

THE WEST VIRGINIA PHARMACEUTICAL ASSOCIATION held its annual meeting in the Senate Chamber at Wheeling on June 6th and 7th. In his annual address President S. Laughlin referred to some of the enemies of the pharmacy law in the Legislature and severely criticised their reprehensible conduct. Changes in the prices of staple drugs were mentioned and interesting information was given relating to the causes of fires in drug stores.

The treasurer reported a balance of \$131.41 on hand.

The election of officers resulted in the choice of E. L. Boggs, Charleston, for President; C. M. Shrewsbury and Miller Iams for Vice Presidents; Chas. Moenkemoeller, Wheeling, for Secretary; R. T. Richardson, of New Martinsville, for Treasurer, and C. A. Potterfield for Local Secretary, the Association deciding to meet on June 7th, next year, at Charleston.

At the evening session various committee reports were read; also papers on the preparation of elixirs, by C. M. Shrewsbury, and on the use of the microscope in pharmacy and medicine, by Edward Rothlein.

At the third session the establishment of a College of Pharmacy was discussed by Dr. Colly Shriver, of Bethany, who was opposed to establishing such a college unless there was a fair prospect of its being entirely self-supporting.

A number of committees were appointed, and after transacting other routine business, the Association adjourned.

ORLEANS PHARMACEUTICAL ASSOCIATION is the title of a local society organized at New Orleans, La., June 5. Its officers are A. K. Finlay, President; R. J. Rivet and G. J. Mattingly, Vice Presidents; W. B. Gill, Secretary; C. L. Keppler, Corresponding Secretary, and W. Graner, Treasurer. The meetings are held on the first Monday of each month.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Report of the Initiatory Proceedings of the Louisiana State Pharmaceutical Association at the meetings held at New Orleans, April 24, 25 and 26, 1882. New Orleans. 8vo, pp. 35.

An account of this meeting will be found on page 326 of our last number.

Compte rendu de la manifestation du corps pharmaceutique belge en l'honneur de Mr. Norbert Gille, président honoraire de l'Association générale pharmaceutique de Belgique, etc. Par E. Van de Vyvere. Anvers, 1882. 8vo, pp. 44.

This reprint from the Antwerp "Journal de Pharmacie" gives a full account of the manifestation of the Belgian pharmacists, including the speeches, in honor of Prof. Norbert Gille. This distinguished laborer in the interest of pharmacy was, at the University of Brussels, presented with his portrait, and subsequently a banquet was given in his honor.

Materia Medica and Therapeutics. Inorganic Substances. By Chas. D. F. Phillips, M.D., etc. Edited and adapted to the U. S. Pharmacopœia, by Laurence Johnson, A.M., M.D., etc. New York: Wm. Wood & Co., 1882. 8vo. Vol. I, pp. 298; Vol. II, pp. 340.

The volumes do not treat solely of inorganic substances as indicated upon the title page, but also of certain organic compounds, which are conveniently considered with others of strictly inorganic nature. Under the compounds of iodine iodoform is mentioned, and among the acids we find acetic, citric and tartaric acids, their salts being described under the respective metals.

The first volume is devoted to the non-metallic elements and their compounds, including the alkaline iodides and bromides, and concludes with the metals aluminum and antimony, the remaining metals and their medicinal compounds being considered in the second volume in alphabetical order. In each case the chemistry is briefly given, followed by a more extended account of the medical properties under the headings of absorption and elimination, physiological action, including toxic properties and antidotes; therapeutical action, both external and internal preparations, dose and mode of administration. In this part the medical literature appears to have been thoroughly consulted and well used. The chemistry is necessarily brief, giving the mere outlines of preparation and the most important characters and tests, condensed from the British Pharmacopœia, the nomenclature of which is used throughout the work. In several cases, brevity in giving the characters is at the expense of clearness; thus it is stated of potassium nitrate that "at a red heat it deflagrates," and of potassium bichromate, that "the solution readily gives up part of its oxygen and when acidified with sulphuric acid, turns green from reduction of chromic acid and formation of green sulphate of chromium."

The Opium Habit; its successful treatment by the Avena sativa. By E. H. M. Sell, A.M., M.D. 8vo, pp. 8.

A reprint from the "Medical Gazette," describing results obtained with the concentrated tincture of *avena sativa*, which is claimed to contain the active principle of oats; from affidavits appended to the paper we learn that the so-called active principle is an alcoholic extract of oats, one ounce of which dissolved in ten ounces of alcohol produces the concentrated tincture.

A Contribution to the Subject of Nerve-stretching. By Wm. J. Morton, M.D. New York. 8vo, pp. 32. Reprinted from the "Journal of Nervous and Mental Diseases," January, 1882.